DOCUMENT RESUME

ED 031 283 LI 001 649

By-Corbin, John B., Ed.

Proceedings of the Second Texas Conference on Library Automation (Houston, March 27, 1969).

Spons Agency-Texas Library Association.

Pub Date [Jul 69]

Note-78p.; The proceedings of the first conference are reported in ED 020 760.

Available from-Mrs. Jean Branch, Houston Public Library, 500 McKinney Avenue, Houston, Texas ($1.50)

EDRS Price MF-$0.50 HC-$4.00

Descriptors-*Automation, Computers, Costs, Electronic Data Processing, *Library Acquisition, *Library Circulation, *Library Planning, Recordkeeping, *Serials, Special Libraries, University Libraries

Identifiers-Midwestern University Moffet Library, Texas Instruments Inc Library, Texas Southern University Library

Four papers are included in these proceedings. The first three discuss specific on-going programs, including details of operation: (1) "Automation of Serials," by Shula Schwartz and Patricia A. Bottalico, reports a serials records automation at Texas Instruments Inc., Dallas, Texas; (2) "From Texana to Real-Time Automation," by Calvin J. Boyer, reports an on-line circulation system for Moffet Library at Midwestern University, Wichita Falls, Texas; and (3) "Data Processing Applications for Acquisitions at the TSU Library," by Alvin C. Cage, describes activities at Texas Southern University, Houston, Texas. The fourth paper, "Planning an Automation Program," by John B. Corbin, discusses the problems and processes of planning for automation. (JW)

ED031283

LI 001649

PROCEEDINGS
SECOND TEXAS CONFERENCE ON LIBRARY AUTOMATION
March 27, 1969

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PROCEEDINGS

of the

SECOND TEXAS CONFERENCE ON LIBRARY AUTOMATION

held March 27, 1969
Albert Thomas Exhibition Center
Houston, Texas

Edited by
John B. Corbin

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

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Sponsored
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Texas Library Association

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Editor's Note

In 1966, when the first Texas conference on automation was held (also sponsored by the Acquisitions Round Table of the Texas Library Association), practically every person in Texas who knew anything about automation was on the program. Now, three years later, the Conference Planning Committee had its choice of several speakers for each topic and there wasn't enough time to cover all the subjects available or desirable.

All speakers for this Second Texas Conference on Library Automation were chosen mainly because they have representative programs thought to be of general interest and the most benefit to the Conference's registrants. The prime criteria for choosing the speakers was that they all are involved in on-going automation programs.

Unfortunately, the address of our keynote speaker, Don S. Culbertson, Executive Secretary, Information Science and Automation Division, American Library Association, was unavailable for publication. However, all other papers presented at the Conference are herein published.

The Conference Planning Committee consisted of Mrs. Jean H. Branch (Houston Public Library, Houston, Texas), Chairman of the Committee and Chairman of the Acquisitions Round Table for 1968-69; Mr. Jay B. Clark (Houston Public Library, Houston, Texas); Mrs. Kay McMurrey (Texas State Library, Austin, Texas); Mr. Frederick H. Ruecking (Fondren Library, Rice University, Houston, Texas); and Mr. John B. Corbin (Tarrant County Junior College District, Fort Worth, Texas).

All editorial work and typographical errors are the responsibility of the undersigned editor and cannot be blamed on the Acquisitions Round Table.

JBC
Fort Worth, Texas
July 28, 1969

AUTOMATION OF SERIALS

By Shula Schwartz
And
Patricia A. Bottalico

The program indicates that I am going to talk about the automation of serials. How I wish serials could be automated! Then I wouldn't have to continue with this presentation. However, since automated serials have not yet arrived, I will address myself instead to automation of serials records at Texas Instruments Inc. in Dallas, Texas.

Before going into an oral and visual explanation of our systems, it would be well to consider at this point a brief history of the company and its growth, along with the growth of the library system, since it is due to the growth-rate that we looked to automation.

The company, now known as Texas Instruments Inc., began life as Geophysical Service Inc. in 1930. Today, Texas Instruments is known for its work in the field of electronics, but back then it was excited about discovering the secrets of the earth by seismic methods.

In 1941, Geophysical Service Inc. split from a larger company it had become a part of and began independent operation through the efforts of four men: Cecil Green, Eugene McDermott, Erik Jonsson, and Dr. H.B. Peacock - all of whom played a vital role in the subsequent growth and success of the company. At this time, December 6, 1941, the company had six geophysical field crews and 100 employees. By 1947 it opened new quarters for 300 employees.

By 1951 Texas Instruments Inc. had been created to manufacture transistors as a licensee of Bell Telephone Labs. Then, in 1954 it grew a silicon

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crystal, and history was made. The original company, Geophysical Service Inc. had become a subsidiary of Texas Instruments, and the company, which began operation in 700 square feet of rented space in Newark, New Jersey, now occupies 260 acres of land in Dallas and covers the globe with 46,747 employees.

Paralleling the growth of the company was the growth of the library system. The first recollection of a TI library dates from 1944. At that time, the library consisted of one four-foot shelf of books in the Research Department. By 1949 it had expanded into a large, quite attractive room filled with books and requiring one attendant.

By 1954 the library had enlarged to two rooms. Its operation now required a staff of three, including one professional librarian. Even so, TI's library, like so many other departments, was experiencing growing pains. Five years later, in 1959, TI had three separate libraries with full-time professional and clerical help. A fourth library began operation in 1962, but was merged with one of the existing libraries in 1967.

As the library system, or the Corporate Technical Information Center, as it is now called, continued to grow, it became obvious that some centralization of activities was necessary. After being incorporated under one administrative head, the services area was the next activity to be centralized. This included cataloging and acquisitions activities.

The acquisitions center was set up originally in 1964 to handle the book and serial orders for the libraries. In 1965 it had increased its responsibilities to become the purchasing arm for all company-paid serials, books, and other published materials.

Now, before anyone can ask, "what has all this to do with the automation of serials," let's examine why we at Texas Instruments looked to automation.

Staffing is a problem in any library, but it is a particular one in a special library, where it usually comes under the budgetary heading of "overhead," and, personnel who do not actively contribute to profits are not hired in great quantity. Yet, as the foregoing brief history shows, the growth-rate of the company has been phenomenal. In 1954, when the company had just begun its great leap forward, the library staff, as noted earlier, consisted of one professional and two clerks. Today, some fifteen years and 30,000 employees later, the staff consists of one administrator, nine professionals, and six clerks. In fact, since 1965, the staff has decreased from a total of twenty people to sixteen.

It becomes obvious that we had to look for a way to "work smarter, not harder," and automation seemded to be the only answer.

Our keynote speaker, Don Culbertson, said in an article appearing in College and Research Libraries that "the processing of serials and the maintenance of serial records are sufficiently independent areas of library activity to make a system feasible which is not necessarily tied to other aspects of library operations. Also the repetitive nature of much serials work lends itself to mechanization."[1]

The survey on the Use of Data Processing Equipment, conducted by Eugene Jackson, IBM consultant, sponsored by ALA and the Library Technology Project, indicated that in special libraries the acquisition of serials and journal renewals were among the first of the library routines to be mech-

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[1] Culbertson, Don, "Costs of Data Processing in Book Acquisition and Cataloging," College and Research Libraries, Vol XXIV (November, 1963)

anized or automated.[2] This is easy to understand when we bear in mind that the journal collection is perhaps the most-used source of information in a special library.

The automation of serials records can be a "complete from start to finish" system, or, specific aspects of it can be automated. That is, a system can begin by preparing the order, checking in each issue, providing routing slips, and automatically preparing claims notices. Or, it can just be automated in its initial ordering, or any part in between.

The Texas Instruments serials automation system, unlike Athena, did not spring full-grown from the head of a computer. It has been automated in a series of procedures and still has a few more steps to climb before becoming a complete system.

Ironically, the whole process of automation began with a program that initially was not an internal company problem - our desire to participate in The Texas List of Scientific and Technical Periodicals.[3] When TI participated in a Dallas-Fort Worth union list of serials and in the Houston List of Serials, each library submitted its holdings independently.[4] A decision was made, at the inception of the Texas List, to automate the periodical holdings records of the TI-Dallas-based libraries and to produce a machine printout of periodicals. Copies of this list could then be forwarded to each of the company libraries and one copy could be submitted to the

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[2] Creative Research Services, Inc., The Use of Data Processing Equipment by Libraries and Information Centers (Chicago: American Library Association, 1966)

[3] The Texas List of Scientific and Technical Periodicals, ed. by Harold G. Richardson (Houston: Phil Wilson, 1968)

[4] The Houston List of Serials, ed. by Lois Debout (Houston: Phil Wilson, 1963). This was an earlier edition of the Texas List.

Texas List.

Heretofore each library maintained its own listing of its holdings. The union list was instituted, then, by asking each librarian to submit a record of her holdings to the technical consultant assigned to automate the program.

The program was originally designed to use a people-readable, machine-manipulatable record to be printed on an IBM 407 accounting machine. The system is comprised of two basic types of cards: (1) header cards, which give title or cross reference information, and (2) trailer cards, which give the holdings of the various libraries.

These cards are linked by a common journal code number, which is a five-digit number assigned in such a manner that it places the title in an alphabetical arrangement by numeric sorting. On the initial assignment of title codes, 100 units were left between titles to allow for later additions.

Corrections to the list are sent to the list editor at the librarian's convenience, and, once a year, a new list is printed and photoreproduced, which completely supersedes the previous list.

Although the original program was designed for printing on an IBM 407 printer, it is now being produced on a 1401 printer, which speeds up the process considerably. With only a brief program change, it can also be printed on an IBM 360/Model 20 computer, which would provide an even faster output.

It took considerable manhours to set this project up. Since the work was done during the spare time of the consultant, it is difficult to estimate just how much time was spent. However, the saving in manpower hours since

the program began, as well as the other projects which were developed from the initial effort, has more than justified the original expenditure of time.

For example, before automation, each library had to type its list at least once a year. For the smallest library, typing time amounted to at least four hours of professional time. For the larger library, this time was tripled. Now the updating of information is done by a data processing technician within the Library Acquisitions Center as part of an overall updating program for serials.

The IBM general information manual on mechanized library procedures states:

> The fundamental principle of data processing is that information once recorded in a punched card may be used time and time again. In library operations this means that if information from a request is punched ... into cards and verified, the cards may be used to initiate other functions. The advantage of using punched cards then becomes apparent: one recording of data permits the majority of library functions to be accomplished mechanically and the manual retyping of the same information, or elements of the same information, can be eliminated.[5]

With this in mind, we began the second phase of automation of our serials records - library subscriptions.

Subscriptions for TI's Dallas-based libraries are ordered by the Central Library Services area, which also receives and distributes the periodicals for two of the libraries. The other library receives its subscriptions at its mailing address and handles its own claims.

In deciding to automate this procedure, we took into account that the most time-consuming task had already been done in preparation of the union list - preparation of a master title list. The title cards simply were dup-

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[5]International Business Machines, Mechanized Library Procedures (White Plains: IBM, n.d.), p.1.

licated from the union list deck and edited to remove historical scope notes that were of no value in the subscription list, and we were ready for the ordering of library subscriptions.

To determine the feasibility of automating, let's examine what was done before. Each year each librarian typed and submitted to the Central Library Services area a complete listing of subscriptions for the coming year. This meant going over last year's list, adding titles which had been ordered during the year, deleting those titles no longer wanted, and then retyping the complete list. The lists then had to be collated, vendors chosen, and purchase orders typed. Preparation began sometime in July.

With the conversion to a machine system, a complete printout of subscriptions, which includes new titles added during the year, is provided each librarian. The librarian then submits an attached listing of new titles for the coming year and marks through those titles to be deleted. The list is returned to Library Acquisitions, the new information is punched into the system, the old cards are removed, and a corrected list is printed out for the librarian while purchase orders are printed out for the vendors.

The program writes renewal orders to any vendor (one vendor at a time) for any given expiration date and punches out a set of subscription record cards showing the order and item number, vendor, and new expiration date.

Figure 1 is a sample purchase order (reduced in size) prepared by the computer. Although the library subscription program consists of several cards, only Cards 1 and 5 relate directly to the subscription ordering program. At the bottom of the figure we have prepared two samples of the information which is keypunched into these cards:

LIBRARY SERIALS / PURCHASE ORDER & CARD FORMATS

TEXAS INSTRUMENTS INCORPORATED - LIBRARY ACQUISITIONS CENTER - P.O. BOX 5474 - DALLAS, TEXAS 75222 VENDOR AMERICAN INST PHYSICS

SUBSCRIPTION PURCHASE ORDER LC-96703 INTERNAL CHARGE 08-6625-209 PAGE 1

OCTOBER 17, 1966 THE BILLING IS TO BE PROVIDED IN TRIPLICATE, REFERENCE THE ORDER NO., AND BE SENT TO THE LIBRARY ACQUISITIONS CENTER.

PLEASE PROVIDE THE LISTED SUBSCRIPTIONS FOR THE PERIODS INDICATED AND ADDRESS THEM TO

TEXAS INSTRUMENTS INCORPORATED
APPARATUS DIVISION LIBRARY
P.O. BOX 6015
DALLAS, TEXAS 75222

ITEM	JOURNAL TITLE	QUANTITY	PERIOD		RATE		EXTENSION
1	ACOUSTICAL SOCIETY OF AMERICA. JOURNAL	1	01-67 THRU 12-67	$	22.00	$	22.00
2	AMERICAN JOURNAL OF PHYSICS	1	01-67 THRU 12-67	$	12.50	$	12.50
3	AMERICAN PHYSICAL SOCIETY. BULLETIN. SERIES 2	1	01-67 THRU 12-67	$	5.00	$	5.00
4	APPLIED OPTICS	2	01-67 THRU 12-67	$	15.00	$	30.00
5	APPLIED PHYSICS LETTERS	1	01-67 THRU 12-67	$	15.00	$	15.00
6	JOURNAL OF APPLIED PHYSICS	1	01-67 THRU 12-67	$	25.00	$	25.00
7	OPTICAL SOCIETY OF AMERICA. JOURNAL.	2	01-67 THRU 12-67	$	30.00	$	60.00
8	OPTICS AND SPECTROSCOPY/OPTIKA I SPEKTROSKOPIYA	1	01-67 THRU 12-67	$	55.00	$	55.00
9	PHYSICAL REVIEW	1	01-67 THRU 12-67	$	50.00	$	50.00
10	PHYSICAL REVIEW LETTERS	1	01-67 THRU 12-67	$	17.50	$	17.50
11	PHYSICS TODAY	1	01-67 THRU 12-67	$	4.00	$	4.00
12	REVIEW OF SCIENTIFIC INSTRUMENTS	1	01-67 THRU 12-67	$	13.00	$	13.00
			TOTAL THIS ORDER	$		$	309.00

Figure 1

ACOUSTICAL SOCIETY OF AMERICA. JOURNAL 025000 1

APP 01 12 66 P 03 1-16703 0022.00 0022.00 209 025001 5 02

AMERICAN JOURNAL OF PHYSICS 061000 1

APP 01 12 66 P 03 2-16703 0012.50 0012.50 209 061001 5 02

Lby Name — Qty — Exprtn Date — Acq Type — Vendor Code — Item-PO No. — Unit Price — Extension — Lby CC — Title CODE — Card Type — Lby Code

Card 1 is the title card which contains the full title of the periodical and its numerical code

Card 5 contains all the other information relating to the subscription; i.e., library name, number of copies, expiration date, how acquired (purchased, membership, donation, etc.), vendor code, item number on the purchase order, unit price, total price, charge number, title code, card type, and library code.

To clarify the system further, let us now examine a flow-chart of the entire library system (see Figure 2).

As I have already indicated, the system is actually made up of several cards. Aside from Cards 1 and 5, which are used for the subscription record, Card 2 is a cross reference to a new title for an old serial, and Card 3 contains information such as publishers' policies on availability and combination subscriptions. This information is combined with the subscription information on Cards 1 and 5 for the subscription list (Card 4 is the trailer card used in the union list system to indicate holdings and is not used in the subscription program). Information on Cards 2 and 3 does not appear on the subscription orders.

Steps in the library subscription renewal program:

Step 1: Cards 1, 2, 3, and 5 are sorted and sequenced alphabetically by title

Step 2: This prepares our current subscription deck of punched cards

Step 3: In late summer, the card list is programmed through the IB^{M} 1401 computer, which prepares a list of current subscriptions for each library

Step 4: The lists are checked by the librarians. Titles no longer required or those which have ceased publication are deleted; lists of new titles and/or additional copies of existing titles are indicated

Step 5: The lists are returned to the Library Acquisitions Center, where the new cards for the additions are prepared. Cards for titles to be dropped are removed manually from the file

Step 6: These cards are then sorted and merged with the subscription deck which is then programmed again through the computer

Library Serials/Renewal Test and Purchase Order System

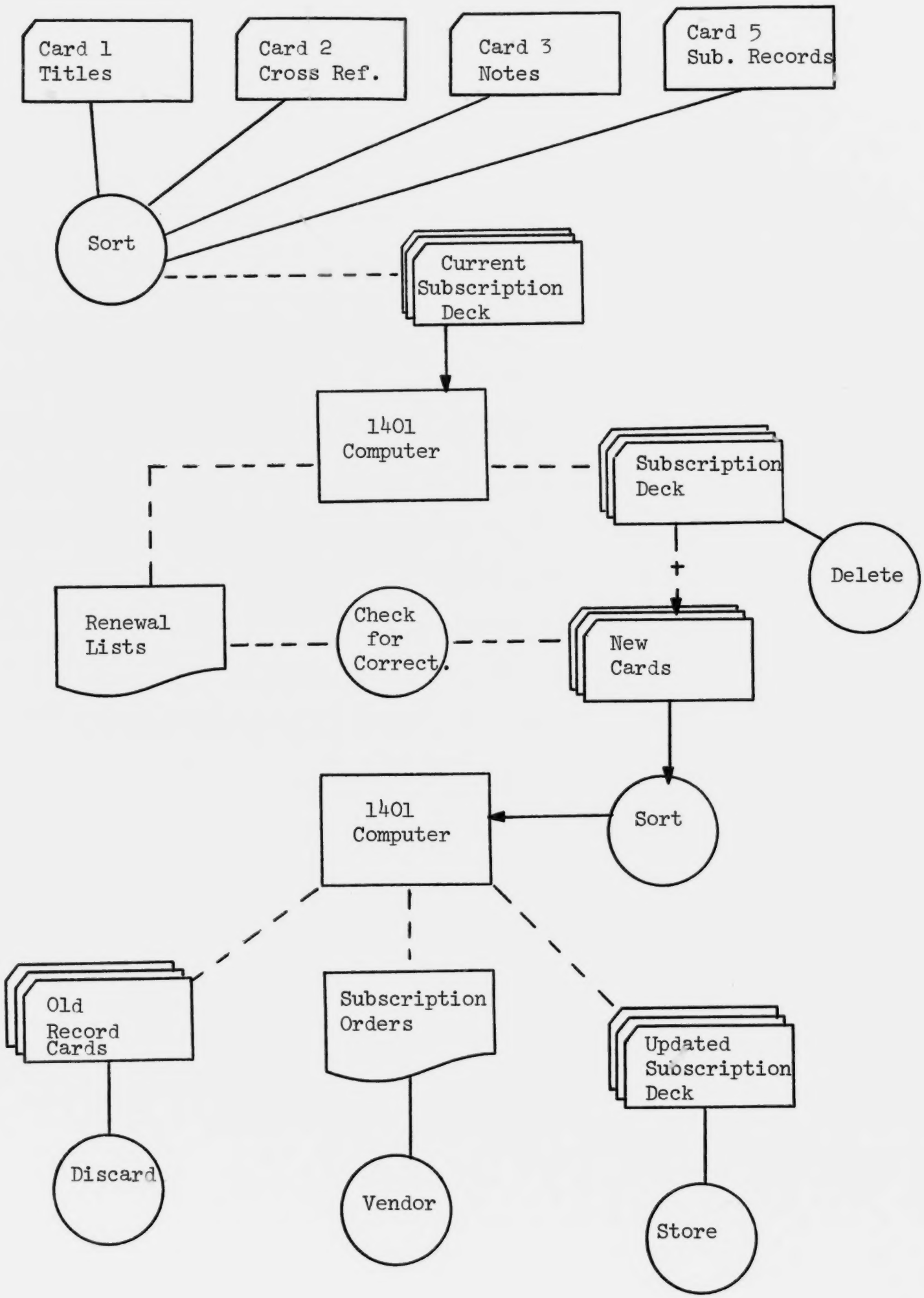

Figure 2

Step 7: The computer now prepares the purchase orders to our various vendors

Step 8: While preparing the purchase orders, the computer also punches up-to-date subscription record cards, automatically updates the information, and removes any obsolete cards from the file

Step 9: The purchase orders are sent to the vendor

Step 10: The old records are discarded and the updated subscription deck is stored

I quoted earlier from the IBM manual on library operations about getting as much mileage as possible out of the information punched in a card. We have seen how the preparation of a title deck for the union list led to the development of a library renewal and purchase order system. This was carried one step further to include a periodical circulation system.

Circulation of periodicals is a problem that is probably not as prevalent in libraries other than special libraries, since most academic, public, and school libraries do not circulate periodicals. As an example of how important periodical circulation is to a special library, let me quote some statistics here.

Two of our libraries circulate 458 titles, regularly, to 2,321 requestors. The total number of periodicals checked out of the library in one year includes 7,140 bound periodicals and 11,904 single issues. As you can see, this represents quite a distribution problem.

B.A. (before automation) it was almost impossible to keep up with the changes in our circulation lists - that is, the lists representing the 458 titles going to 2,321 requestors. Employees are constantly changing locations. Terminations occur regularly and new employees are continually arriving. Previously, routing lists were typed by hand at the beginning of each year. This took approximately two weeks of typing time. It took an average of ten to

twenty hours a month to retype lists to include corrections. By the time changes were made, there were already changes to the changes.

Since one person is responsible for receiving 746 subscriptions, maintaining the Kardex records, issuing claims, preparing tables of contents, and keeping circulation lists up-to-date, and since patrons were complaining about their periodicals not keeping up with them, we decided to automate this procedure also.

The circulation system was developed in two steps. First, a request list for the patron was prepared in which he could indicate which titles he wished to see.

Now, since a title deck for each of the libraries was available as a by-product of the union list program, in May, 1965, the decision to computerize the circulation request list by making use of this title deck was made. The punched cards from the union list, which contained the periodical title and their codes, were printed out on the IBM 407 and sent to the librarian, who indicated which periodicals were to circulate and which were not to be listed on the circulation list. The titles not to be included were removed from the deck, and the lists were reprinted for distribution to the patron.

The procedure has been up-dated since that time, using the library subscription deck rather than the union list product, and the IBM 1401 rather than the 407. Otherwise, the system is the same.

Attached to this list of titles is a form to be returned to the library (see Figure 3). This form becomes the worksheet for keypunching the request cards. As the bulk of the information (Columns 3-37) remains the same on each requestor card, the keypunch operator needs to punch this infor-

TO: COMPONENTS GROUP LIBRARY - MS 20

DATE _____

DIV NO. (3 4) – COST CENTER (5 6 8)

FIRST NAME (OR INITIAL) FOLLOWED BY LAST NAME (Put no more than one letter between each space) (11 – 35)

MAIL STN. (37 39)

Skip first positions if number has fewer digits than space provided

PERIODICAL CODE NUMBERS FOR DESK CIRCULATION (66 – 70)

Figure 3

TI-8683 PERIODICAL ROUTING REQUEST

SUPERVISOR'S SIGNATURE _____

mation only once, and the selection cards (after the first one) are prepared by duplicating the information in Columns 3-37. This can be programmed to be done automatically on the keypunch machine. Then only the periodical code numbers needs to be added

After punching is completed the cards are sorted by mail station, merged with the title deck and printed on the IBM 1401, using the subscription title deck.

These lists are then sent to the librarian to indicate (1) circulation of full-size copies, (2) circulation of table-of-contents, and (3) extra copies needed. The lists then are returned to the Library Acquisitions Center.

The same title deck used for the original lists, plus the individual request cards, are utilized once again. An additional title card is prepared when more than one copy of a title is to be circulated. To indicate which title is to be circulated, the periodicals clerk inserts a card indicating the library to which the magazine is to be returned. Table-of-contents distribution lists do not have a library designation on them.

Corrections and additions to the lists are made on a once-a-month basis. New or corrected cards are keypunched and inserted manually, while old cards are deleted manually. The lists are printed then again from the corrected deck.

Let's take a look at this system via a flow chart of the operation (see Figure 4).

Step 1: Circulation selection sheet is received in the Library Acquisitions Center

Step 2: Selection cards are keypunched

Step 3: Title cards are merged and sorted with the selection cards

Step 4: The cards are fed into the IBM 1401 computer

Library Serials/Circulation System

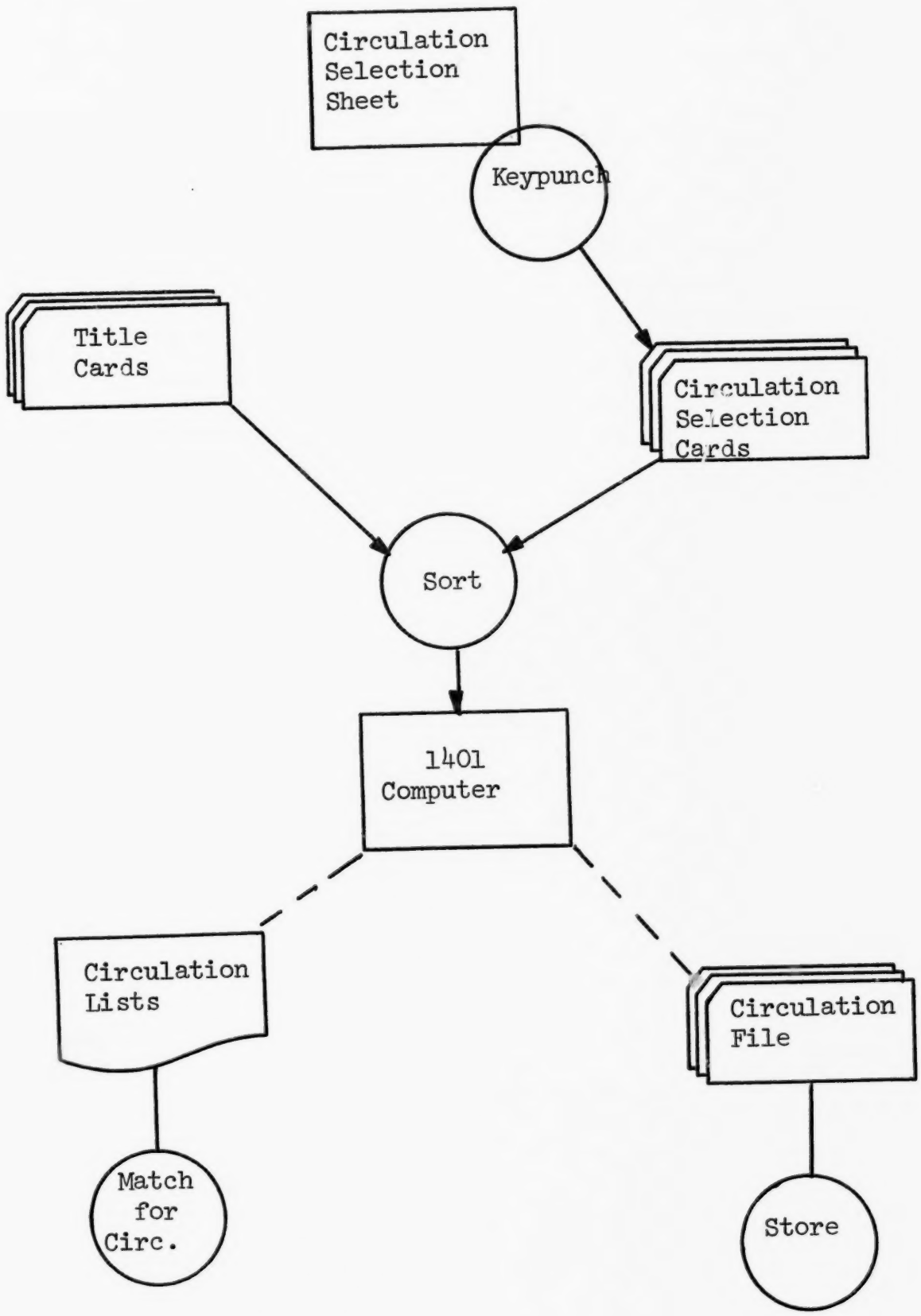

Figure 4

Step 5: Circulation lists are prepared and ready to be matched with the periodical

Step 6: Circulation cards are stored until ready for corrections, additions, and deletions

What did we accomplish with this little program? I indicated in a previous statement that we were spending approximately two weeks typing circulation lists at the beginning of each year and about ten hours a month retyping lists for corrections. Now, keypunching additions and corrections takes about two hours a month and new lists are printed on the IBM 1401 in about twenty minutes each month. So it becomes quite obvious that much time is saved which can be utilized in other work areas.

To further emphasize the policy of utilizing keypunched information as often as possible, let us see how one set of records has been used for three operations (see Figure 5).

As you can see, Card 1, or the title card, is used in all three systems. And, when we look further, we see that the information in Columns 66-70 carries over for all systems; Column 71 is repeated in two systems; Column 77, in three systems, and Columns 79 and 80 in two of the systems.

Our library subscription record system is one that is common to most libraries. But our problems do not end there. Several years ago it was discovered that the company was paying for close to 2,000 subscriptions that were going directly to individuals or groups within the company. Nowhere was there a single record of the number, type, or dollar amount of these subscriptions. Management decided, therefore, that all subscriptions must be ordered through the Library Acquisitions Center and all records maintained there.

Requests for subscriptions are sent to the Library Acquisitions, where

CARD LAYOUT FORM
TI-3497

PAGE _____ OF _____

KEYPUNCH CARD LAYOUT - SHOWING FACTORS COMMON TO ALL PHASES OF LIBRARY SERIALS AUTOMATION
SYSTEM

1.

TITLE OF PERIODICAL

Title Continuation

TITLE CODE | SEQ | CDTYPE

2. UNION LIST

HOLDINGS | FIRST YEAR | LIB ABB | BOUND | TITLE CODE | SEQ | CDTYPE | LIB CODE

3. SUBSCRPTN RECORD

LIB ABB | QTY | EXP. DATE (MO | YR) | TYPE | SOURCE | ORDER NO. (ITM NO. – P.O. NO.) | UNIT COST | TOTAL COST | COST CTR | CIRCULAT POLICY (TC | CPY | RES | CO) | TITLE CODE | SEQ | CDTYPE | LIB CODE

4. CIRCULATN LIST

DV | C C | PARTICIPANT'S NAME | M-S | TITLE CODE

5.

6.

Figure 5

they are verified and prepared for ordering. When this is done, the record keeping begins. But, before showing you the flow chart, I would like to show you some of the problems we had to solve, which is why the system for non-library subscriptions is so much more complicated than the library system (see Figure 6).

As you can see, much more and varied recordkeeping is required for the non-library system.

Figure 7 is actually divided into two parts. The unshaded portion takes the request and converts it into a purchase order. The shaded area shows what happens at renewal time. Let's start with a subscription request:

Step 1: Upon receipt of the request, three punched cards are prepared

Card 1: The subscriber record, which contains the subscriber's name, accounting designation, business and/or home address

Card 5: The order card, which is a combination of the codes for the particular title, the number of copies, and the subscriber's name, code number, address, and accounting designation

Card 6: Vendor or source card, which contains all the information needed about the title being ordered; e.g., title code, vendor code, the date of order, desired expiration date, price, and vendor code

Step 2: Cards 5 and 6 then are sorted and merged into the order deck

Step 3: The order deck is fed into the IBM 1401 computer, which prepares the order, when is then sent to the vendor

Step 4: While the computer prepares the order, it automatically produces a subscription record (Card 2). This card contains and combines the information in Cards 5 and 6 into one record card

Step 5: The record card (Card 2) is then combined with the subscriber record (Card 1) and sorted alphabetically by the subscriber's name to produce a subscription record card

We are now ready to move to the shaded area or renewal program (see Figure 7).

COMPARISON OF LIBRARY AND NON-LIBRARY SUBSCRIPTION SYSTEMS

I. Library System

1. To obtain, periodically, complete or selective (by expiration date) lists of active subscriptions for review and for source record (for claims)

2. To prepare purchase orders for subscription renewals and new subscriptions

3. To maintain a record of all the library holdings

4. To prepare lists of circulating titles and lists of individuals for distribution of same

5. To prepare list of periodical titles (numerical and alphabetical)

6. To provide financial reports to management of library subscription expenditures, by cost centers

II. Company-Paid (Individual) System

1. To obtain regular renewal reports for subscriber review

2. To prepare purchase orders for both new and renewal subscriptions

3. To maintain current lists
   a. Participants plus subscriptions
      (1) Full name and address (home and office)
      (2) Full periodical title including expiration date and destination
   b. Periodical titles (numerical and alphabetical)
      (1) Price
      (2) Source
      (3) Normal expiration date policy
      (4) Special note (such as "payment in advance")
   c. Source
      (1) Numerical by vendor code
      (2) Alphabetical including titles of periodicals ordered

4. To prepare quarterly reports to division managers by their cost centers
   a. Value of all existing subscriptions
   b. Quarterly figure
   c. Total figure (all divisions)

Figure 6

COMPANY-PAID (NON-LIBRARY) SERIALS / RENEWAL TEST & PURCHASE ORDER SYSTEM

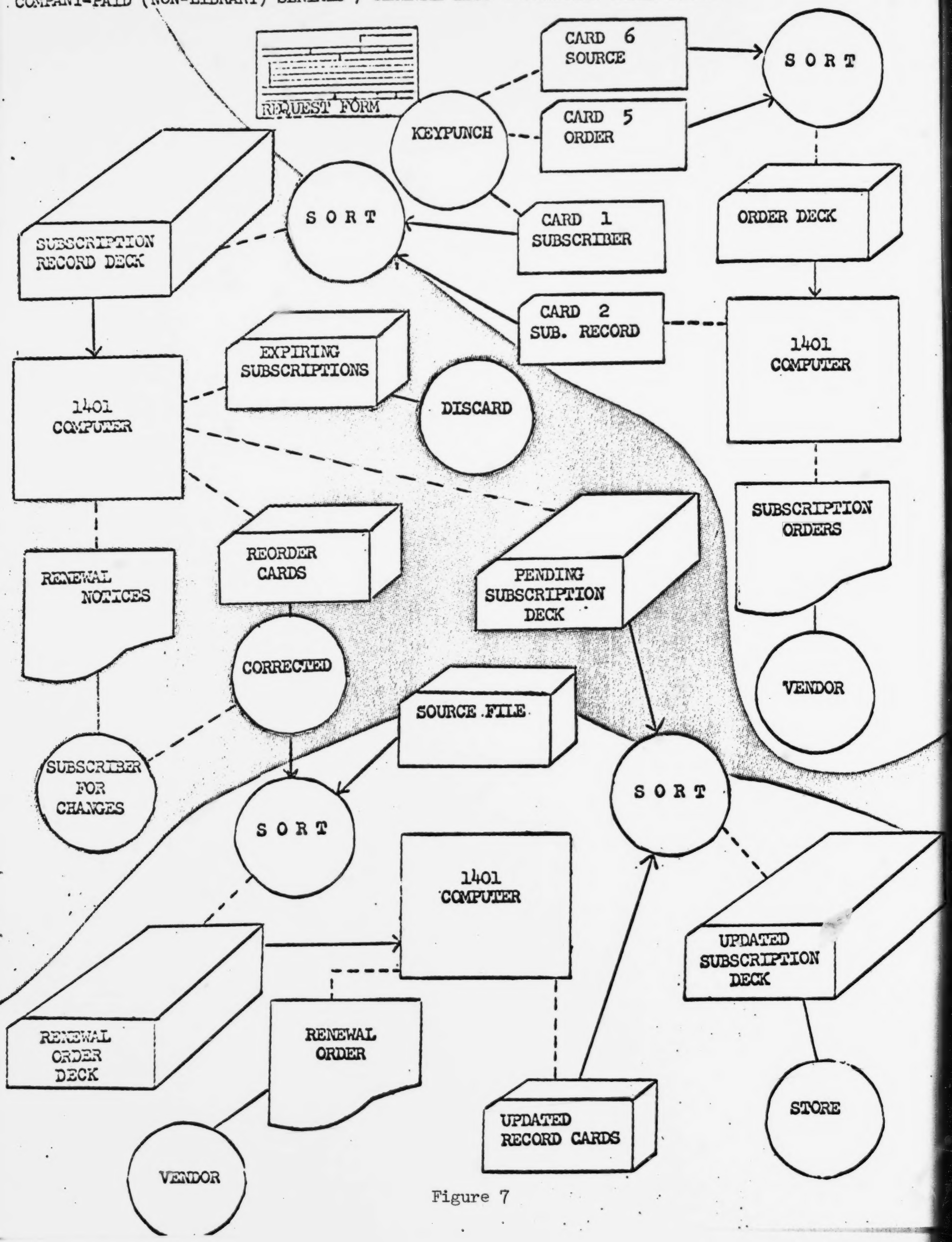

Figure 7

In order to keep from overloading the subscription order deck, non-library subscriptions, whenever possible, are entered for a period of one year, beginning in July and expiring in June. Library subscriptions are requested on a calendar-year basis, whenever possible. However, many publishers only will provide service on a calendar-year basis, so the subscription program for non-library renewals must be run twice annually.

In March and September the renewal test program is run:

Step 1: The subscription record deck is fed into the computer

Step 2: The computer prepares renewal notices for subscriptions due to expire

Step 3: During this process, obsolete record cards are removed and discarded and new order cards (Card 5) are prepared and stacked separately

Step 4: Renewal notices are sent to the subscribers for changes, corrections, and proper authorization

Step 5: The order cards (Card 5) are then merged and sorted and a renewal order deck is prepared

Step 6: The renewal order deck is processed through the computer and a purchase order is prepared and forwarded to the vendor

Step 7: As in Step 3, record cards are automatically prepared

Step 8: The up-dated record cards then are merged and sorted with the subscription deck, creating an up-to-date subscription deck of all orders on record

Figure 8 will show what the purchase order looks like and how the information is transferred from the various records.

None of the systems I have spoken of are really highly complicated. They can all be performed on first or second generation computers. In fact, the library subscription program, renewal program, and circulation system can all use basic electronic data processing equipment, using an IBM 407 printer

ORDER NO. 12680090 DATE-SEPTEMBER 15, 1968 — NEW SUBSCRIPTIONS FOR MAGAZINE-0416 CBD REG-M

PAGE 1 — Obtained from Card 7 which precedes order file — VENDOR-12370 BERNAN ASSOCIATES

SUBSCRIBERS NAME (7)	MAILING ADDRESS (10)	NO. OF COPIES (9)	TO EXPIRE (4)	COST (5)	DIV CC CHARGE (8)
R. S. JONES	TEXAS INSTRUMENTS PO BOX 6015 MS247 DALLAS TX 75222	1	12-31-69	15.00	01-875
J. M. SMITH	1500 HAPPY LANE,RICHARDSON TEXAS 75080	1	12-31-69	15.00	03-825

Figure 8

Order date, used in Card 2. — Meaning Agent. Used in 2 Card. — Card Type

(1)	(2)	(3)	(4)	(5)		(6)		
0416	12370	CBD REG-M	091568	123169	001500 A	BERNAN ASSOCIATES		6
0416	12370	RSJONES	01875	01	PO BOX 6015 MS247 DALLAS TX 75222		098735	N
0416	12370	JMSMITH	03825	01	1500 HAPPY LANE,RICHARDSON TEXAS 75080		107940	5
		(7)	(8)	(9)	(10)			

Subscriber Code Used in 2 Card

Card Type & Address identification
N - Business
5 - Other

COMPANY-PAID (NON-LIBRARY)SERIALS

PURCHASE ORDER FORMAT

ORDER DECK / CARD FORMATS

for listing. It takes a little longer, but the process is still faster than manual manipulation.

There are still many problems to overcome. For instance, we would like to combine our library and non-library systems. But this in itself presents a unique set of problems. For instance, the library system has as its basic information source a title card while the non-library system considers the subscriber card most important.

We would like to have a storage system other than punched cards in order that information could be more readily up-dated and subscriptions could be ordered more often than twice a year.

The Company is in the process of developing a company-wide management information system based on a remote access, on-line system for an IBM 360. We are hoping to be able to tie into this system eventually. In the meantime, we have found that the systems in use have enabled us to keep up with an increased workload while not requiring any additional personnel.

In conclusion, I would like to state that in dealing with automated procedures we must remember that it works for you. You must be able to tell it what to do. To quote Hillis Griffin: "The computer ... is much like a new clerk coming into the library without any experience in library work. Just as the new clerk needs to be instructed in the intricacies of her job, so the computer must be instructed how to handle each job."

If the automation of serials is approached in this light, it can, as shown by the examples presented here, insure that the task can be well done in the same way regardless of changes of personnel.

FROM TEXANA TO REAL-TIME AUTOMATION

By Calvin J. Boyer

In retrospect, 1967 was a vintage year for Moffett Library at Midwestern University. With the advent of this new year, the Library found itself squarely facing an entirely new vista. A series of generous donations of money and materials to Moffett Library provided opportunities to pioneer new facets of library automation as well as to materially strengthen library holdings.

Early in the year, the effects of a gift of $200,000 from Mrs. J. J. Perkins and the Charles Prothro Family quickened the pace of library activity. The gift was equally divided between funds for materials and funds for the implementation of library automation.

The first division of funds placed at the disposal of the Library an amount more than double the annual State appropriation for library materials. Coupled with the State funds, this donation enabled the Library to embark upon a rapid acquisitions program designed to narrow the gap between the growth of the University and the ability of the Library to support existing programs.

The remaining funds, designated for the implementation of automation, created the impetus for the developments described in the latter part of this paper. With this gift the Library was able to acquire a computer and supporting equipment necessary to undertake explorations in new facets of library automation techniques. With primary access to a computer, the Library had already solved a problem that often confronts other libraries - the problem of the lack of necessary access or priority for experimentation that must precede new applications. Too, other departments on campus had not yet had

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Calvin J. Boyer, at the time this paper was presented, was Director of Libraries, Midwestern University, Wichita Falls, Texas. He currently is in a post-masters degree program at the University of Texas at Austin.

time to develop applications due to the recency of the acquisition of the computer which further insured needed access.

On November 20, 1967, an on-line automated circulation system was put into operation in Moffett Library at Midwestern University. This system, designed to charge, discharge, and list all materials in circulation as well as detect overdue materials and prepare all notices and computations, is, it is believed, unique in college and university library applications.

One might conclude, after reviewing existing literature on circulation control, that an original yet practical application of automated circulation control would seem to be increasingly difficult to devise. The remainder of this paper seeks to relate briefly the research behind, the feasibility of, the conversion to, and the operation of an application which would seem to couple originality and practicality with wide-spread applicability.

The inventory control function of the library circulation section is a fertile area for automation because the repetitive routines of circulation control lend themselves readily to machine processing. The preciseness of machine data manipulation increases the efficiency of the circulation section which should allow the section to increase the quality of its service to the community it serves. An examination of the literature further illustrates that more wide-spread progress in automation of library circulation control has been accomplished than in any other single area in libraries.

Numerous librarians who are already familiar with the potential benefits of automated circulation control, and especially of operational on-line status, found and continue to find themselves facing a dilemma: the need for immediate action to cope with increasing levels of circulation versus what appears to be a lack of access to the necessary equipment. One solution

would seem to be to utilize basic equipment already available. This solution was the basis for the formulation of guidelines initially established in developing the system described in this paper.

The broad guidelines first established to channel early considerations were found to be nearly sufficient and were later neither modified nor ignored. Briefly stated, the guidelines were:

1. Employ a central processing unit currently in wide-spread use
2. Assume that the CPU must be shared by other departments with the Library
3. Include on-line status for the circulation control system

It was apparent that the adoption of a model system by other libraries would result only if the computer employed was one already familiar to both data processors and librarians. Thus, in 1967, this factor narrowed the field to a computer of the second generation. To wait until the third generation computer becomes available to most libraries, with its added sophistication and capacity to serve, would be to ignore the present need for relief from nearly universal increased levels of circulation activity.

The second guideline, recognizing the fact that the computer selected must serve in other capacities on campus in addition to the projected library application, limited the selection of the CPU to advanced capacity machines of the second generation. Examinations indicated that the business office and the registrar's office were usually among the first on campuses to employ data processing.

It was, therefore, apparent that selection should insure compatibility of intended utilization between these prime users and the Library. Combined usage of these three departments would be sufficient in many instances to

justify acquisition of an installation solely for their individual use.

The apparent incompatibility of the second and third guidelines, i.e., multiple users, yet on-line status of the library circulation control application with access limited to a CPU of the second generation, posed the greatest, though not insurmountable, obstacle. The desired solution was one of near simultaneous data manipulation for the Library and other departments, rather than library monopolization of the computer during hours of library operation.

Analysis of circulation activity reveals that although access to the computer must be continuous for on-line operation, actual cumulative machine time needed to complete charge and discharge transactions when measured as total elapsed time for each complete cycle, represents only a small fraction of the total day's operations.

The final solution employed a mechanical buffer between the library terminal and the CPU in conjunction with a programmed interrupt capability incorporated within a special monitor program under which the CPU normally operates in this installation. This offered the Library on-line status, and near simultaneous data processing for all other users on the campus.

Once these broad guidelines were established and tested, consideration of equipment was begun. Potential equipment available to the Library was largely determined by the guidelines themselves. Though an oversimplification, what remained was the IBM 1400 series. This series, already widely available, incorporated versatility and dependability. Coupled with the likelihood that even more units of this series would become available to the academic world as they are replaced in the commercial world by third generation

computers, the Library chose as its foundation piece an IBM 1401 16K CPU. To complete the installation the following major components were selected as support elements in the equipment configuration:

IBM 1402 Card Read Punch
IBM 1406 Storage
IBM 1311-002 Disk Drive (2)
IBM 1311-004 Disk Drive
IBM 1403 Printer
IBM 1409 Console Auxiliary
IBM 1026 Transmission Control
IBM 1031 Input Station
IBM 1033 Printer

Of these components, the IBM 1030 Data Collection System (composed of the IBM 1031 Input Station and the IBM 1033 Printer) was the only element installed in the Library. The remainder of the configuration was installed in a remote facility with Library access provided via telephone cable.

It should be noted that other than the 1030 element, only the 1409 and 1026 pieces are foreign to an equipment configuration that might be characterized as a basic data processing facility. In cost projections it should, therefore, be made clear that rental of these pieces must be considered by the library in addition to projected needs of required machine time based upon known or projected circulation levels.

Once the equipment configuration was determined and acquired, activity centered primarily around two areas - programming and producing machine readable records. As the equipment configuration was unique, actual conversion was not begun until the equipment was delivered and installed in order that, in cases in which options existed, decisions might be based upon actual machine operations.

Programming was facilitated by two factors and proved to be the quicker

of the two activities to complete. The Data Processing Supervisor and a machine operator constitute the data processing staff of Midwestern University. Recognizing this factor and coupling it with the previous experience of the supervisor on machines of the series; adding the element that the conversion had been assigned a high priority; and noting that a one-to-one working relationship with the Library was established; one might expect a rapid conversion. The process involved two people; therefore, progress was greater than one might expect in other situations involving either a greater number of people, or one in which operation has not been assigned a top priority.

Production of machine readable records involved student identification badges and book cards. The identification badges were produced by the Student Services Office during registration. The last step in badge preparation was encoding the student identification number (Social Security Number) in the upper half of the card using the IBM 013 Badge Punch.

The greatest effort required in the conversion process involved the production of book cards. In this application only three columns of eighty within the card are needed for control columns - columes one and eighty signal the beginning and end of the transmission, and a third column is encoded to set the length of loan period. The remaining seventy-seven columns are used to contain data describing the piece - normally accession number, call number, and author-title. Fixed fields were assigned to each. Due to the variable length of the author's name, a code symbol is used to separate author and title. This symbol allows maximum utilization of available space within the field.

Cost figures are only indicative of the local situation being described,

and are, therefore, omitted from this paper. Production rate of ID badges matched that of other registration steps. Some 3,500 badges were prepared in twelve hours with less than 2 per cent badge-punch errors.

Production rates for book cards varied greatly with keypunch operator and subject area. Punching directly from the shelf list tray, operators with no previous keypunch experience, after a period of familiarization with the machine and catalog card data, could produce 175 to 200 cards per hour with less than a 3 per cent error level. This application encoded more data per card than have most other circulation automation ventures. Since more data was recorded, it was decided to punch directly from the shelf list rather than encode sheets for mark page readers.

Information recorded on the card was not verified until the card was inserted into the card pocket within each book. Even then, only the accession number and call number were verified letter by letter. Author-title information was visually scanned for obvious errors rather than letter by letter inspection.

From the keypunch, the cards were transported to the Data Processing Center in order that blank columns in each card could be eliminated because the 1030 Terminal, without modification, will not accept blank columns. As a by-product of this step, an inventory of materials was accumulated in machine-readable form. In this step, the original card was replaced by a custom-printed one with all eighty columns filled. Later the originals could be sorted and a listing by call number or author or title be prepared.

From the Center the cards were returned to the Library to be inserted into the books. Another by-product was produced in this step in that an in-

ventory of materials was taken automatically as each card was inserted into the proper book and that particular piece was accounted for. The residue of cards for which the pieces were missing represented lost, strayed, or stolen materials.

Once programming was completed and even before all materials could be prepared for automated charging, the system was put into operation. A resume of basic operations and procedures is given below.

Each day circulation control is placed on-line when the Library opens. Simply stated, the computer functions as would any other CPU except throughout the day it is continuously asking internally if the Library wishes to process a transaction. Operating under a monitor program, the machine, to the observer, appears to be engrossed in the operation that it may be processing for another department; however, several times each second, it has checked to see if the Library wished access.

Even when the Library has a transaction to complete, the pause is so slight that the uninformed observer would not detect the interruption in the basic task as the CPU stops long enough to complete the Library charge or discharge. At the Library terminal the operation requires, under normal conditions, less than three seconds to send data and receive a printed transaction of the operation.

An oversimplification of the charging process follows: the student presents a book to be charged along with his ID badge. The book card and the badge are inserted into the 1031 teleprocessing unit and the data is relayed to the machine buffer (1026). The buffer stores the data momentarily until the CPU halts its routine processing through the interrupt capability of the

monitor program and then processes the library information.

The processing involves several sub-routines. The more important ones involve the checking of student status and present obligations, and the computation of loan periods. First a registry file is checked to see if the person is entitled to borrow material. If not, a notice will be returned to the library assistant indicating that the borrower does not presently have borrowing privileges.

A list of students currently enrolled is maintained by the Registrar's office which the Library uses as a basis for borrowing privileges. To this list the Library adds staff and faculty names and area users as they obtain borrowing privileges. By checking current status, the system prevents charges to students who are no longer enrolled but still in possession of ID badges.

If status is clear, then the machine examines the borrower's record to determine if he is either charged with overdue materials or unpaid fines. If either situation is present, the library assistant will be notified and the charge blocked until the material is returned or fines paid or other arrangements made. In both of the above instances the Library has the capability of forcing an override and completing the transaction.

If all is in order, the loan period is computed from the code in the book card, the transaction is recorded on the disk file, the information sent back to the 1033 printer which then prepares a transaction slip showing the accession number (for use in clearing the material through the door check), the borrower's number, and the date that the material is due. This slip is then inserted into the book and the charge is complete.

The on-line capacity allows for other desirable features which are not permitted in off-line charging systems. The ID badge, in addition to the borrower's identification number, is encoded to show classification - student, faculty, staff, area user, etc. In charging materials, the computer can override the date due period encoded in the book card and charge the material to a faculty member for the remainder of the term, to an area user for ten days or even withhold reserve materials from an area user.

The library assistant who is engaged in this process merely inserts the book card and ID badge into the machine. The assistant is not required to determine borrower classification, to change date due periods on a charging machine for different materials or classifications of borrowers, or to use different date due cartridges, etc., as are common in other systems.

Discharging follows the same general procedure. The book card and a book return badge are inserted into the 1031. The charge is cleared from the disk file after it has been determined that the material has been returned on time. If it is overdue, a fine is computed and a notice prepared. If the book is on hold for another reason, the operator is notified to hold the book, and a notice to the requestor will be issued at the end of the day.

Like off-line automated charging systems, overdue and fine notices are prepared at the end of each day in this application. The notices are printed on post-card paper which require only separation before mailing. Notices contain author-title data in addition to the call number for ease of identification for the patron, together with an explanation of the cause for the notice.

Each day, at the end of all circulation processing, an updated cumulative listing of materials in circulation is prepared for use by library patrons for the following day. The listing contains author, title, call number, accession number, borrower's number, date due, and length of loan period. In addition to the listing of materials in circulation, there are two supplemental listings - an activity report listing each transaction of the prior day and a report listing all persons with unclear records, indicating what materials are either now overdue or what materials were returned late. All fines are listed on this sheet, and student assistant calculations for fine determination are unnecessary. This insures uniformity for all fine calculations.

Too, management reports are produced daily indicating activity of the previous day by subject classification and borrower classification. Cumulated listing of materials in circulation is analyzed also in this manner.

Librarians who are familiar already with library circulation control using the IBM 357 system have shown, as outlined by IBM, that system's - ability to:

Involve the patron as little as possible
Accurately identify the patron and charged-out material
Provide for variable loan periods
Simplify library procedures
Provide data on all loaned material
Detect overdue books and prepare notices
Obtain a daily count of charged-out material
Provide classification data on books used
Provide management reports

This new system is able to do all of these things and others, too, more efficiently and more simply than a system based upon the IBM 357.

This application of the 1030 Data Collection System, coupled in an on-line capacity to the IBM 1401 computer in a remote facility, offers these

additional particularly desirable features:

1. The loan period is coded into each book card. This eliminates the need for multiple date due cartridges employed in the IBM 357 system

2. The on-line capacity provides the ability to override the loan period in the book card by coding the borrower's badge either to lengthen (for faculty), or to shorten (for area users) the loan period

3. The on-line capacity in this system provides the ability to automatically withhold materials from a delinquent borrower until overdue materials are returned, fines are paid, or an override command is given

4. Reserve books are automatically returned to reserve status when they are discharged. They then appear on the daily circulation printout as charged to reserve

5. Though the Library does not presently have any books on an hourly reserve, this status would be accessible by a slight modification of the system and the addition of a clock mechanism

6. When necessary or convenient, the Library can determine who has what items checked out, and whether they are overdue, by means of an on-line inquiry feature

The capacity of this application is limited only by the storage capacity of the data processing equipment; however, this particular installation has a capacity of more than 15,000 charges at any one time. Too, the number of 1030 stations can be fitted to the particular application, although only a single station is employed at Moffett Library.

Many other essentials, though less significant, have been included in this system, though not mentioned in this brief resume.

Within the space of a single year, with the support of the academic community and interested citizens through their generous support of materials and funds, Moffett Library has been able to capitalize upon the opportunities afforded in the long mile "from Texana to real-time automation."

DATA PROCESSING APPLICATIONS FOR ACQUISITIONS AT THE TSU LIBRARY

By Alvin C. Cage

Background and Initial Proposal

Texas Southern University was established in 1949 as the Texas State University for Negroes. The Library of Houston College served as the core collection for what is now the TSU Library.

The Library's budget has traditionally been inadequate to support the curriculum, but recent increases promise improvement in this situation. Since 1960, the book budget has quintupled to approximately $120,000 in 1968.

The Acquisitions Department in earlier years served primarily as an order generating and receiving agency. Accounting procedures were maintained by the Fiscal Office of the University. Requests were verified by the department, and duplicates were either approved or eliminated. Multiple-copy order forms were typed by students. Contract purchase orders were prepared to accompany the item order slips. These orders were delivered to the Fiscal Office, where the accounting functions were completed and the orders mailed.

Two parts of each order form were retained by the department and filed by main entry. A third part was sent to the Library of Congress as a card order. When the book was received, the cards and one order slip were pulled from the file; one copy was retained as the copy of record. File bulk and resultant filing errors made the receiving procedure time-consuming.

Preceding the conversion to computer-produced orders, the department's personnel consisted of one librarian, four clerical assistants and seventy-five hours per week of student aid. The department also had responsibility

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Alvin C. Cage, at the time this paper was presented, was Coordinator of Technical Services, Texas Southern University, Houston, Texas. He currently is Assistant Librarian for Public Services, Fondren Library, Rice University.

for checking in the 1,250 periodicals received.

In the Spring of 1966 the procedures of the department were beginning to collapse from their own weight and that of the dramatically increased budget. The feasibility of computer assistance in acquisitions was explored. In June, preliminary discussions were held concerning the various alternatives open to the Library. The decision to submit a proposal for mechanizing acquisitions was made shortly thereafter by the librarian. Conferences with institutional representatives of IBM culminated in a proposal which was submitted to the University's fiscal vice-president and was approved.

The proposal requested permission to rent an IBM 026 keypunch from which punched cards could be created for the generation of orders by the University's computer. Library staff would be trained to use the keypunch and to do the necessary programming.

Following approval of the proposal, two librarians enrolled in a course in SPS-1, a programming language for the 1401 computer, and a member of the clerical staff was selected for keypunch training. Projections called for the first computerized orders to be generated during the 1967-68 school year.

Procedures and Systems Summary

Submission of Book Request.--The typical book order begins with a request submitted by a faculty member or student. The individual initiating the request fills out a book request card (see Figure 1) indicating all pertinent bibliographic information in the appropriate spaces on the card. An instruction sheet is provided to aid him in this task.

Checking and Editing.--The book request card, if approved, is then grouped with others in alphabetical sequence to facilitate checking. The

TEXAS SOUTHERN UNIVERSITY LIBRARY LC No. .....

TITLE American industry in a developing economy
(including vol. & edition) 2 33

AUTHOR Skinner, W
34 46

PUBLISHER Wiley
47 53

DATE 1968
54 57

LIST PRICE 9.50
58 62

PUBLISHER'S ADDRESS .....

COPIES ..... DATE REQUESTED .....

Business
RECOMMENDED FOR DEPT.

AUTHORIZED SIGNATURE

● FOR LIBRARY USE ONLY

BIP ..... ACQ .....

I.D. No. .....
77 80

CC ..... OTHER .....

COVER SLIP FOR BOOK ORDERS

VENDOR _____
2 21

ST. ADDRESS _____
29 54

CITY _____
55 80

VENDOR INFORMATION

AG ORDER # _____
29 37

CONTRACT # _____ DESC _____
38 43 44

DISCOUNT _____ ITEM # _____
46 49 50 56

_____ _____
57 58

_____
80

Figure 1

cards are checked in Books in Print or another appropriate tool to determine availability and to verify citation accuracy and price information. Out-of-print books are submitted for searching after a control card for the master file and acquisitions list has been cut. Then the card catalog and machine-generated acquisitions lists are checked.[1]

To eliminate the problems created by corporate and joint authorship, checking is done primarily by title. Duplicates found are noted in the appropriate place on the card, deleted from the checking procedure, and, later, routed back to the faculty member with an explanation. The remaining requests are sorted for editing and ordering.

After the cards have been sorted by fund and vendor, they are grouped in batches of approximately twenty-five for order number assignment. At this time, the cards are edited with a fine point, felt-tip pen. Words or letters that the keypuncher is to omit are deleted by striking through them with the pen.

All editing is reviewed by the Acquisitions Librarian because of the critical nature of the work. Guidelines and rules for editing are set down in a procedure manual. Suffice it to say here that the first four letters of the first significant word of the title and the first eleven letters of the author's last name are preserved intact to ensure correct listing on the alphabetical acquisitions lists.

The final step in editing is the assignement of the four-character ID numbers. The first two characters are numerical and represent the book's position on the order. In other words, the first book listed is assigned the

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[1]During the conversion from manual to machine ordering, it was necessary to check the old, manually-maintained acquisitions file as well as the new machine-created lists. This file was phased out in the Summer of 1968.

number, "01," the second, the number, "02," etc. The third character may be either a letter or a number and is assigned from a departmental code list, which indicates the departmental book budget to be charged.

The fourth character is numerical and is assigned to every book ordered during a given fiscal year. It is the last digit of the first calendar year of the fiscal year of the order. For example, all books ordered during fiscal year 1967-68 will be assigned the number, "7;" during fiscal year 1968-69, the number, "8," etc.

Finally, the completely edited and assembled deck of request cards is banded together with a cover slip, the order number is assigned and recorded in a ledger, and the deck is placed in line for keypunching.

The cover slip (see Figure 1) contains instructions for punching the vendor address and vendor information cards (see Figure 2). They contain the name and address of the vendor in edited form, the fund and order number, the item and contract numbers for State contractors, the discount, and, in coded form, the various special instructions or statements called for by the nature of the order.

Keypunching.--On the book request card under each unit of information are printed the columns of the book order card into which this information is to be punched. The keypuncher punches this information exactly as edited and, upon completing the card, duplicates it by holding down the duplicate key of the 026 keypunch. The cards are automatically fed by the machine and stacked in order after punching (see Figure 2).

Upon completing each order, the keypuncher places it in a "completed" tray. Orders are kept separate from each other within the tray by dividers.

VENDOR INFORMATION CARD

VENDOR | AGENCY ORDER NO. | BOARD OF CONTROL NUMBER | CLASS NUMBER | ITEM NUMBER | DESCRIPTION | DISCOUNT

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

678698 BSC

VENDOR | STREET ADDRESS | CITY

VENDOR

ADDRESS

CITY

VENDOR ADDRESS CARD

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

678696 BSC

RECD.	TITLE	AUTHOR	PUB.	DATE	LIST PRICE	NET PRICE	ORDER NO	I D NO
	[illegible]	[illegible]	[illegible]					

ORDER CARD - INCLUDE WITH SHIPMENT

RETURN THIS CARD IN THE BOOK WITH SHIPMENT

UNIVERSITY LIBRARY
TEXAS SOUTHERN UNIVERSITY

BOOK ORDER CARD

FOR LIBRARY USE ONLY

RECD	NET PRICE

IMPORTANT

FAILURE TO INCLUDE THIS CARD WITH SHIPMENT WILL DELAY PROCESSING OF THIS ORDER FOR PAYMENT.

678696 BSC

Figure 2

After the day's orders have been punched, the book order program card, which aids the keypuncher in attaining format accuracy, is removed from the machine and the vendor address program card inserted in its place.

The vendor address cards for all of the day's orders are then cut. This procedure is repeated for the vendor information cards. The dividers between orders in the completed tray are then removed and the appropriate vendor address and vendor information cards are inserted behind each order in their place. The completed data pack consists of book order cards, followed by one vendor address and one vendor information card for each order.

Verifying.--Preliminary to the computer run, the cards are visually verified. The Fiscal Office maintains the final responsibility for accounting records. Since the keypunching facility is housed in the Library, the cost of verifier rental is saved. Furthermore, cards may be verified satisfactorily for our purposes by sighting, which is faster, though less accurate, than machine verification. The master pack is now ready for computer run and is placed in a "verified" tray.

Special Forms

From the early planning stages, it was felt that any mechanized acquisitions procedure should make the fullest use of computer potential in terms of the system configuration available. It was also felt that a truly effective system would incorporate both manual and mechanical procedures in a systematic operation. It became quickly evident that, to do this, the multiple order form system in current use would have to be aban-

done along with its traditional system of manual file maintenance.

To do this in an economical operation which would involve a minimum of manual file maintenance requires a form of data record readable by both man and machine and containing essential book information in one physical, easily handled, and readily rearrangeable unit. Of the several forms available, the punched card was an obvious choice.

Book Order Card.--The book order card (see Figure 1) contains eleven fields of significant data. Thirty-two and thirteen positions are allotted for title and author respectively. These are followed by a seven-position publisher field, a four-position data field, and two fields of five positions each for list and net price.

Columns 68 through 80 are occupied by the order-ID number, which serves to indicate fund, order number, item number, department to be charged, and fiscal year. Column 1 of the card is reserved to indicate, in coded form, the status of the book order. This card serves as the master unit record for the system.

Vendor Address and Vendor Information Cards.--The book order cards, containing individual book data, are assembled together with a vendor address and a vendor information card to comprise the data pack for each order (see Figure 2).

The vendor address card contains the name and mailing address of the company to which the order is to be sent, and the vendor information card contains the vendor's name, fund and order number, contract and item number for State jobbers, and special instructions in coded form.

The cards are color-coded - red for vendor address and green for vendor information - to facilitate visual identification in an assembled deck. They also are punch-coded by type for machine verification.

Book Order Form.--Fiscal regulations of Texas Southern University require the submission of book orders on State-designated forms. The Texas State contract purchase order form was modified to fit our needs and machine requirements. The resultant book order form (see Figure 3) is an 8 1/2- by 22-inch, eight-part, continuous form. The original contract purchase order form, slightly modified, is alternated with 8 1/2- by 11-inch blank sheets for listing book data (see Figure 4). The eighth part is an envelope with carbon positioned for automatic addressing.

Computer Center Procedure

Weekly Procedure.--Every Friday morning at 9 a.m., a messenger from the computer center picks up a tray of cards containing the data packs and update cards for the weekly run.[2] These are in order and ready immediately for the book order program to be run. After this is done, the vendor address and vendor information cards are removed, the remaining book order cards are sorted by department, and the departmental book budget list is run (see Figure 5).

Then, the master file supplement, the book order cards for new orders, and the update cards are loaded onto a disk.[3] The information is sorted alpha-

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[2]Master file cards for book orders filled or cancelled during a week are updated to show the revised status of the order.

[3]The master card file and its supplement are stored in the Library. A duplicate of each file is kept in the computer center on tape.

CONTRACT PURCHASE ORDER

ACCORDING TO YOUR CONTRACT THRU THE TEXAS STATE BOARD OF CONTROL

ON ALL PAPERS AND PACKAGES SHOW THESE NOS.

TE
2 06 68

IMPORTANT ! RETURN ENCLOSED CARDS WITH SHIPMENT

NTRACTOR AND SHIPPER
BAKER & TAYLOR CO.

DRESS
GLADIOLA AVENUE

Y
MONENCE, ILL. 60954

IPPED VIA

PREPAY ALL CHARGES

STATE BOARD OF CONTROL CONTRACT

ORDER NUMBER 116137

AGENCY ORDER NO. TSU - 50 - 16810-0222

All Invoices Are to be Written
On Comptroller's P-I Form (in Quintuplicate)

←MAIL ALL 5 COPIES TO

TEXAS SOUTHERN UNIVERSITY
UNIVERSITY LIBRARY
3201 WHEELER AVENUE
HOUSTON TX 77004

THIS SPACE FOR AGENCY USE ONLY

TEM	DESCRIPTION	QUANTITY	UNIT PRICE	EXTENSION
	CLASS 095 37-8001			
	BOOKS, AS PER ATTACHED LIST	17		$ 77 37

LIBRARIAN

Figure 3

LIBRARIES POSTED COPY

TEXAS SOUTHERN UNIVERSITY LIBRARY - BOOK ORDER LIST

ORDER NO.
16810-0222

TITLE	AUTHOR	PUB	DATE	LIST	I.D. NO.
DERN ENGLISH SENTENCE STRUCT	ROGOVIN S	RANDOM	1964	4.50	02-H8
STHETICS & PHILOSOPHY CRITIC	LEVICH M	RANDOM	1963	8.50	03-H8
DERN TRAGICCMEDY	GUTHKE K	RANDOM	1966	1.95	04-H8
DEFENSE OF IGNORANCE	SHAPIRO K	RANDOM		1.95	05-H8
ERICAN LANGUAGE	MENCKEN M	RANDOM	1963	9.00	06-H8
RDS AND WAYS OF AMERICAN ENG	PYLES T	RANDOM	1963	1.95	07-H8
EM OF POETRY	KREUZER J	MAC	1955	2.75	08-H8
ISTOTLES POETICS	HOUSE M	OUFOUR	1956	2.95	09-H8
NGUISTIC STRUCTURES IN POETRY	LEVIN S	MOUTON	1962	2.75	10-H8
BLIC SCH & PRIVATE PRACTICE	WILSON J	HUMANI	1968	3.75	11-G8
RATRE ON FRONTIER	CARSON M	BLOM	1965	12.50	12-H8
CNCUNCING DICT OF AMER ENG 2ED	KEYON J	MERRIAN	1953	4.00	13-18
CNCUNCING DICT OF AMER ENG 2ED	KENYON J	MERRIAM	1953	4.00	14-18
CNCUNCING DICT OF AMER ENG 2ED	KENYON J	MERRIAM	1953	4.00	15-18
RECTORY EXCEPTIONAL CHILD 5 ED	HAYES E	SARGENT		7.00	17-18
HOCLMAN IN LAW LIBRARY	REXNY A	INTRSTE		1.50	18-18
INBURG WORLD ATLAS MOD GEO 5ED		BARTHOL		4.32	19-18
TOTAL BOOKS THIS ORDER - 17		-TOTAL-		77.37	

Figure 4

LIBRARIES POSTED COPY

TEXAS SOUTHERN UNIVERSITY LIBRARY
DEPARTMENTAL BOOK ORDER LIST

REFERENCE OCTOBER 28, 1968

LISTED BELOW ARE BOOK ORDERS RECENTLY PLACED FOR YOUR DEPARTMENT. PLEASE MAKE THIS LIST READILY AVAILABLE FOR DEPARTMENT MEMBERS CONSULTATION.

ANY QUESTIONS CONCERNING YOUR BOOK REQUESTS SHOULD BE DIRECTED TO THE ACQUISITIONS DEPARTMENT, EXT. 282.

AUTHOR	TITLE	PUB	DATE	ENCUMBRANCE
	COLLIERS ENCYCLOPEDIA	COLLIER	1968	225.50
WARTMAN L	CLOSED CIRCUIT TV HANDBK	BOBBS	1964	7.50
SAINSBURY J	DICT MUSICNS EARLST TIMES V 1	PLENUM	1966	13.75
SAINSBURY J	DICT MUSICNS EARLST TIMES V 2	PLENUM	1966	13.75
GOVE P	IMAG VOYAGE PROSE FIC 1700-1800	SAIFER		10.00
SHEEHY E	GUIDE TO REF BOOKS 1ST SUPP	ALA	1968	3.50
WHEELER W	DICT NOTED NAMES OF FICTION	GALE	1917	12.00
WALSH W	HEROES AND HEROINES OF FICTION	GALE	1915	12.00
LOWNDES W	BIBLIO MANUAL OF ENG LIT V 1	GALE	1896	12.20
LOWNDES W	BIBLIO MANUAL OF ENG LIT V 2	GALE	1896	12.20
LOWNDES W	BIBLIO MANUAL OF ENG LIT V 3	GALE	1896	12.20
LOWNDES W	BIBLIO MANUAL OF ENG LIT V 4	GALE	1896	12.20
LOWNDES W	BIBLIO MANUAL OF ENG LIT V 5	GALE	1896	12.20
LOWNDES W	BIBLIO MANUAL OF ENG LIT V 6	GALE	1896	12.20
LOWNDES W	BIBLIO MANUAL OF ENG LIT V 7	GALE	1896	12.20
LOWNDES W	BIBLIO MANUAL OF ENG LIT V 8	GALE	1896	12.20
RAU H	DICT OF PSYSICS & NUC CHEM 2 ED	REINHOL	1965	8.75
GRAY H	DICTIONARY OF PHYSICS	WILEY	1958	16.00
JACOBS M	DICTIONARY OF MICROBIOLOGY	VAN NOS	1957	8.95
CARMICHAEL L	MANUAL OF			
GASKELL G	DICTIONA			
MOORE J	DICTIONA			
LEWIS N	DICTIONA			
KRAPF L	DICTIONA			
KAUFFMAN D	DICTIONA			
PALMER A	DICTIONA			
	DICTIONA			
GAUNT W	DICTIONA			
GAUNT W	DICTIONA			
GRANVILLE W	DICTIONA			
GALLAHER J	DICTIONA			

REFERENCE OCTOBER 28, 1968

TOTAL BOOKS LISTED 31

YOUR ALLOCATION- $ 40,000.0

PREVIOUS ENCUMBRANCE- $.

PRESENT ENCUMBRANCE- $ 571.30

TOTAL ENCUMBRANCE- $ 571.30

BALANCE- $ 39,428.70

Figure 5

betically by author into one file and the supplementary acquisitions list by author is run (see Figure 6). Then the file is resorted by title, and the supplementary acquisitions list by title is run (see Figure 7). The completed lists, newly-created book orders, and cards are returned to the Library by 5 p.m. of the same day.

This procedure is repeated for three successive weeks. Each time, the book data form the new orders is merged with the existing supplementary file, and the resultant supplementary acquisitions lists supplant the lists of the week before. On the fourth week, the cumulated supplementary file is merged with the master file and a new master file is created.[4]

Monthly Procedure.--As stated above, once a month a complete new master file is created after the new book orders have been run. This master file, which constitutes all items ordered to-date, is used to create new acquisitions lists by author and title. These lists supplant all previous lists and the cycle is ready to begin again with the new orders the following week.

This also is the time when other special programs are run as needed. The book order list program, as well as all the previously mentioned programs currently in use, will be described individually and in detail further in this paper.

Received Book Procedure, Cancellations, and Updates

To facilitate prompt and efficient order processing, it is important that the vendor's copy of the book order card be returned with the shipment (see Figure 2). To this end, the statement, "Important! Failure to return

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[4]We have chosen to use the method of supplementary lists rather than a completely new weekly updating to save computer time and cost.

STAT	AUTHOR	TITLE	PUB	DATE	LIST	NET	ORDER NO. I.D.
V	HLIEBEU	MITS WITS & LOGIC	NORTON	1960	4.95	4.46	16810-0187-06-T8
V	HC LEGAL DT	HOUSTON CITY CODE V 1 OF 3	MUN COD	1968	25.00	25.00	16826-0044-01-S8
V	HC LEGAL DT	HOUSTON CITY CODE V 2 OF 3	MUN COD	1968	25.00	25.00	16826-0044-02-S8
V	HC LEGAL DT	HOUSTON CITY CODE V 3 OF 3	MUN COD	1968	25.00	25.00	16826-0044-03-S8
	HCAD W	CASES IN SMALL BUSINESS	MIC BR	1968	5.00	.	56243-0115-19-D8
	HOBAN R	BED TIME FOR FRANCES	HARPER	1960	2.92	.	16810-0696-12-G8
V	HOBSON E	SQUARING THE CIRCLE	CHELSEN	1953	3.95	4.46	16810-0281-19-T8
V	HOCHSTER	METABOLIC INHIBITORS V 1 OF 2	ACADEM	1963	13.00	21.84	16810-0464-01-V8
	HODGES C	GLOBE RESTORED			9.00	.	16810-0678-02-R8
C	HOEFFER F	AFRIQUE AUSTRALE		1848	1.50	.	16810-0489-09-A8
	HOFF S	DANNY & THE DINOSAUR	HARPER	1958	2.19	.	16810-0696-09-G8
	HOFSTEDE G	GAME OF BUDGET CONTROL	HUNANIT	1967	7.40	.	16810-0721-03-D8
	HOGAN R	AFTER IRISH RENAISSANCE	MINN	1967	6.95	.	16810-0611-10-N8
V	HOLLANDER S	DISCOUNT SELLING RETAIL PRICE	A M A	1956	1.00	1.00	56243-0095-29-D8
V	HOLLOWAY E	WHITMAN AN INTERPRETATION IN NAR			10.00	10.00	16810-0572-17-H8
V	HOLLOWAY R	BASIC BIBLIO ON EXPER IN MKTING	A M A	1967	4.00	4.00	56243-0095-21-D8
V	HOLMES S	NEGROS STRUGGLE FOR SARVIVAL		1937	9.00	9.00	16810-0232-08-M8
	HOLT J	HOW CHILDREN FAIL	PITMAN	1964	4.50	.	16810-0697-19-G8
	HOLTMAN R	NAPOLEONIC REVOLUTION	LIPP	1967	4.50	.	16810-0637-06-N8
	HOOPES R	PEACE CORPS EXPERIENCE	CROWN	1968	6.95	.	16810-0635-14-K8
V	HOOVER	YOUNG PRINTMAKERS			3.50	3.50	16810-0382-11-B8
	HORCATH B	HOORCY FOR JASPER	WATTS		2.63	.	16810-0714-05-H8

Figure 6

STAT	TITLE	AUTHOR	PUB	DATE	LIST	NET	ORDER NO. I.D.
V	ACADEMIC REVOLUTION	JENCKS C	DBLDAY	1968	10.00	6.40	16810-0167-21-A8
	ACCEPTED DENTAL REMEDIES	AMER DENTAL	S - C	1966	.	.	- - -
	ACCOUNT AFRIC SIER LEON V 1 OF 2	WINTERBOTTOM		1803	35.00	.	16810-0489-04-A8
	ACCOUNT EMPIRE OF MARCCO	JACKSON J	B & N	1968	20.00	.	16810-0550-20-A8
	ACCOUNT OF TIMBUCTOO AND HAUSA	JACKSON J	B & N	1968	17.50	.	16810-0344-17-A8
	ACCOUNT OF TIMBUCTOO HOUSA	JACKSON J	B & N	1820	20.00	.	16810-0508-16-A7
	ACCOUNT SIER LEON V 2 & V 1 OF 2	WINTERBOTTOM		1803	35.00	.	16810-0489-05-A8
	ACCOUNTING CONCEPTS OF PROFIT	GILMAN S	RONALD	1939	7.00	.	56243-0123-01-D8
V	ACCOUSTICAL DESIG IN ARCH	KNUDSEN	WILEY		10.95	10.76	16810-0127-12-28
	ACCRA SURVEY 1953-56	ACQUAH I		1959	8.50	.	16810-0489-23-A8
C	ACHIEVEMENTS STANLEY & AFR EXP	HEADLEY J		1878	6.00	.	16810-0489-24-A8
Z	ACHIEVEMENT WILLIAM E POWELLS	VANDERBILT K	PRINCTN	1966	5.20	5.20	16810-0505-08-A8
V	ACHIEVING GHETTO	FOLEY E	NAT PR	1968	4.95	3.17	16810-0345-02-L8
	ACHIEVING GHETTO	FOLEY E	NAT PR	1968	4.95	.	16810-0394-04-A8
	ACID TEST	SIMON J	STEIN		5.95	.	16810-0181-05-A8
V	ACOUSTICS OF MUSIC	BARTHOLOMEW W	PR HALL	1942	7.95	5.06	56326-0239-17-Y7
/	ACROSS AFRICA V 2	CAMERON V	DALBY	1877	9.00	9.00	16810-0582-04-A8
Z	ACROSS AFRICA V 1	CAMERON V	DALBY	1877	9.00	9.00	16810-0582-05-A8
V	ACROSS BLUE BRIDGE OR 5 T ED	IVERSON W	SINGER	1965	3.48	2.61	56326-0218-09-F7
V	ACROSS THE PACIFIC	IRIYE A	HARCOUR	1967	8.50	5.44	16810-0482-15-L8
V	ACRYLIC LANDSCAPE PAINTING	PELLEN J	WATSON	1968	12.50	8.00	16810-0387-23-B8
	ACTING AND STAGE MOVE	WHITE E	ARC	1963	2.50	.	16810-0532-04-H7

Figure 7

this card with shipment will delay the processing of this order for payment" is printed in bold type on the book order card.

Since the book order card is a duplicate of the master file card and contains all information vital to the order, having it in hand means quick identification and rapid access to the Library's file on the order. During the first year of operation, the vendors returned cards about ninety per cent of the time.

Processing of the book is a relatively straightforward and simple operation with the book order card in hand. The master card file is housed in a cabinet at the receiving table and is separated by fund, and, within the fund, arranged by order and item number in one continuous sequence.

Using the number on the book order card, the receiving clerk locates the master file copy. She checks this with the book order card and book to determine if the correct book has been sent. Special instructions, such as, "rush - reserve for Dr. Smith," may be written on the master file card and, if so, are noted at this time. If the correct book has been sent it is stamped for library identification. The book order card is inserted in the book, which is forwarded to Cataloging, where it is arranged for NUC searching.

If the book order card does not accompany the shipment, the receiving clerk consults one of the acquisitions lists to determine the order number and then proceeds to the file to pull the master file copy. In this case, no card accompanies the book to Cataloging. Special instructions, when necessary, are noted on a slip of paper and inserted in the book. If the book is to be cataloged for a special collection, a colored flag is inserted

in the book; each special collection is assigned a specific color.

To update the file record, the receiving clerk stamps the date received on the master file card and writes the billed amount in the net price box. The card is then forwarded to the keypuncher who punches an asterisk in the status field (Column 1) to indicate that the book has been received and punches the net price as indicated. This card then becomes part of the update file and is forwarded to the computer center for the weekly run.

Under program control, the tape record, and, consequently, the acquisitions lists are updated to show the new information. Upon the return, the card is filed numerically by order number in a permanent "received-cancelled" file.

In the case of cancellations, the master file card is stamped "cancelled" and the date is indicated. The name of the vendor and the reason for cancellation is written on the reverse of the master card. The card is then forwarded to the keypuncher who punches a "c" in the status field to indicate cancellation.

The card is then duplicated, the information from the reverse of the master card is indicated on the duplicate card, and the card is sent to the acquisitions librarian for appropriate action. The master card is used for updating then returned to the Library for insertion in the received-cancelled file.

Description of Programs

Book Order Program.--The data packs consist of book order cards followed by a vendor address card and a vendor information card for each order (see

Figure 2).

Printed, eight-part purchase order, the last parts of which are envelopes, and punched summary cards - one per order - constitute the program output (see Figures 3 and 4).

The book order cards in the data pack are read and information is listed line by line, each line containing separate book information, on the blank section of the form. The computer keeps a running total of list price and counts each card as it is read. When the vendor address card is read, the total number of books counted and the list price total are recorded at the bottomof the listing.

The form is skipped to the printed portion where information read from the vendor address and vendor information cards is used to complete the order form. A code on the vendor information card enables the computer to distinguish between contract and non-contract orders and instructs it to print from program memory a variety of statements, such as: "not available from the contract jobber," or, "mail to Law Library." If a discount is to be computed, this, too, is done and printed in the appropriate place on the form.

A summary card containing order number, vendor, price, and other important accounting information is then punched. This card is used by the Business Office as direct input for their computerized appropriations ledger program. The printer then skips to a new form and is ready to repeat the process for the next order.

Acquisitions Lists Programs.--Book order cards representing newly-ordered items, update cards (items received or cancelled), and a master tape consisting

of previously ordered items constitute the input. A revised master tape and alphabetical lists of books by title and author comprise the output.

Book order cards, update cards, and the master or supplementary tape are loaded onto a disk and sorted alphabetically by title or author, depending on which list is to be run. Under program control, a new tape is created containing all items ordered to-date in one alphabet. Items previously ordered that have now been received or cancelled are altered to reflect their new status. A printed list then is created from the tape showing all pertinent order information. This is approximately the equivalent of an on-order-received-cancelled file in printed form.

Book Order List Program.--The input is a master tape of all books ordered on a given fund arranged numerically by order number. Within each order, the books are arranged numerically by ID number.

A printed list shows the status of each book and gives totals (number of books received, number of books outstanding, encumberance outstanding, etc.) for each order and gives grand totals for each fund (see Figure 5).

The master tape described above is sorted numerically on a disk and used to create the list on multiple-copy paper. It serves as a ready reference for checking monthly statements from vendors, for correspondence concerning particular orders, and for checking book information when only the order number is known. Statistical totals provide accurate records for accounting and reporting purposes.

Departmental Book Budget Program.--Book order cards for newly-generated orders, together with departmental encumbrance cards showing the department name, code, allocation, and previous encumbrance are fed into the computer.

A printed list by department showing each new book ordered is the output (see Figure 5). The book budget allocation, encumbrance, and balance for the departments are given on a separate sheet. Updated encumbrance cards are also generated.

The book order cards are sorted and grouped by departmental code on a mechanical sorter. Then, the departmental encumbrance cards for each department are interfiled manually in front of the book order cards for that department. The computer reads the cards, stores the accounting information from the encumbrance cards, lists the books, and totals the list prices.

After it has listed the last card for a department, the computer performs arithmetic operations from the stored data and prints the results. It also punches a new encumbrance card showing the updated information. This card is used as input for the next program run. It should be noted that it is necessary to keypunch the encumbrance cards only at the beginning of a fiscal year. From then on, all departmental accounting is handled by the computer from information already in the system.

Costs

One of the most pleasing aspects of the new system is the relatively small cost to the Library in dollars and man hours for the new services created. Given below, in tabular form, is a comparison of various aspects of the old, multiple-order form system to the new computer system. Time figures given are rounded averages stated for comparison purposes and should not be interpreted as precise or conclusive. The Library is not charged for computer time.

Old System

1. Typewriter with multiple-order form platen - $300 purchase
2. Multiple-order forms - $50/M
3. Purchase order forms - supplied by Business Office at no cost to the Library
4. Typing MOF's - 60 seconds each
5. Stripping and sorting MOF's - 45 minutes/C
6. Counting MOF's, totalling prices, computing discount, typing PO form - 15 minutes per order for 25 books per order
7. Manual filing and revision - Acquisitions and On-Order file, 1 1/4 hours per 100 slips

New System

1. Keypunch - $54 monthly rental
2. IBM cards - $.92/M (2 IBM cards per MOF)
3. Contract purchase order form - $220/M
4. Punching and duplicating book order cards - 60 seconds a pair
5. Verifying and correcting book order cards - 60 minutes/C
6. Done on computer - no man hours - 15 seconds per order, for 25 books per order
7. File maintenance part of several computer programs - no man hours

Results and Evaluation

During the first eighteen months of operation under the mechanized system, the TSU Library was expending a special state grant which nearly doubled the book budget. Because of this, it is difficult to make a substantiative comparison of the old multiple-order form-based acquisitions system to the currently operating, mechanized one. It was necessary to add two full-time staff members to the department to perform bibliographic searching, to assist in card editing, and to handle the increased volume of correspondence. Card editing is the only operation directly related to the mechanized procedures and this occupies only one of these people for about one-fourth's time.

There have been several benefits definitely afforded by the system:

1. Precise Organization. One of the most significant benefits of our system, or any computer-based system, is organization. The computer has forced us to standardize procedures, to create accurate data, to make workable decisions, and to plan ahead

2. Procedural Standardization. Because a computer acts only in accordance with specific instructions, every possible variance in data or procedure must be prepared for. The nature of high speed batch-processing encourages one to plan a system that will handle all varieties of data in much the same way

3. Increased Services. The departmental book budget reports, the acquisitions lists by author and title, the book order list, and the accounting control card generated by the book order program are all new services made possible by mechanization

4. More Accurate Record Keeping. Many of the procedures of filing and accounting that were previously done manually are now handled automatically. This has provided records that are more complete, more up-to-date, and more accurate

   Because of the necessity for encumbrance accounting, all orders were previously routed through the University's Business Office before being mailed to the vendors. Partially as a result of mechanized accounting, the Library now has the privilege of sending book orders direct

In addition to definite benefits, there have also been specific problems created by the system:

1. Immediately after system implementation, one of the State contract jobbers reported that it could not return a book order card unless two were sent with the order. The State was not on contract with this jobber while the system was being designed. Hence, the problem could not be anticipated.[5]

   The problem of creating an additional card was not difficult or costly to resolve due to the automatic duplication feature of the keypunch and the low unit cost of IBM cards

2. The problem of mailing the cards was another matter. The automatically-addressed mailing envelope, which is a part of the book order form, was not designed to hold the weight of the additional cards.

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[5]At this writing, orders have been sent to hundreds of other dealers, both large and small, foreign and domestic. None of them has ever requested an additional card.

> Many of the envelopes split along their perforations, allowing cards to be lost in the mail. It became necessary to reinforce each envelope with tape to prevent this occurring

Because we were arbitrarily assigning a fixed number of characters to the component parts of our order citations and editing all of our alphabetical data - book title, author, etc. - to conform to these requirements, we anticipated a higher level of rejection from vendors than under our old multiple-order form system. This has not been the case.

Our rejection rate under both systems has been under one per cent of total books ordered.[6] In each case of rejection, we attempted to trace the error to determine whether the editing itself was at fault. In every case that we were able to determine, we found that mistakes had been made in verifying the original bibliographic data. Since many thousands of requests have now been satisfactorily acted upon by vendors, we feel that our system is a success.

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[6] Rejection rate here refers to orders that can not be filled due to inaccuracies or ambiguities in the data. Publishers' or jobbers' reports of "out of print," or "out of stock," etc., are not included in these calculations.

PLANNING AND AUTOMATION PROGRAM

By John B. Corbin

To Automate of Nor?

"To automate or not?"

As library after library succumbs to new programs of automation, this thought continuously confronts and perplexes the administrator or other librarian who is beginning to think seriously of such ventures.

Plagued by staff shortages and rising costs of everything from wages to library paste, awed by the clutter of information spewing from the world's presses, and haranged by his board, his president, or his staff to cut costs, to provide more services, or to process materials faster, the librarian is being forced to investigate some of the new ideas coming from those interlopers, the "data processing librarian," "automation specialist," "systems analyst," or the like.

Advantages of Automation.--Before the librarian commits himself to a program, he must be or should be aware of several advantages of automation; some are short-ranged, others are long-ranged, some are direct, and others are indirect.

1. Assuming that the machines have been properly programmed and fed the proper information, they can perform their assigned tasks and with fewer errors than can be done manually

2. Automation does free staff members from many of the routine and clerical tasks and does allow them to perform more professional and stimulating duties

3. Because an automated system is capable of absorbing increasing work loads with little loss of efficiency, it allows the number of staff members to remain at a stable level. Thus the endless addition of new staff is eliminated as new services are added or as old services are expanded

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4. Automation can provide essential reports and analyses never available before, thus providing the basis for improved or possibly new services

5. Automation generally sharpens the focus of the organization of a library into clear-cut and precise terms. In arranging the work into efficient flows necessary for automation, all wasted motions and overlapping functions are or can be eliminated or minimized, thus creating streamlined and well-defined operations

6. Automation will ease the interchange of information with other libraries. The resources of other libraries, such as the Library of Congress, a state library, or other regional information centers, could be available readily to an automated library but increasingly inaccessible to an unautomated one

The sum total of the advantages of automation is that, after its proper installation - and I want to stress the phrase, "after its proper installation," the library organization is more efficient, usually less costly per work-unit, and provides more and better services than a manual system while still retaining and increasing the integrity of the professional librarian and other staff members.

Disadvantages of Automation.--Conversely, there are disadvantages to automation; some are dubious disadvantages and can be overcome by time and experience.

1. Automation probably will cost more than manual methods for the first few years. Savings with automation will begin after its first few years of operation with the reduction of inefficiency, stable staff numerically, and increased and improved services with little or no extra cost or staff

2. Automation requires more conscious accuracy on the part of all staff members than is required with manual routines. The repercussions from errors in an automated system possibly are more far-reaching and noticeable than in a manual system, though possibly less costly in terms of money and efficiency

3. Automation requires the full approval, backing, cooperation, understanding, and close attention of the administration, supervisors, and other staff members, particularly during its infancy. Hal-hearted attempts at automation usually terminate in failure

4. Installing an automated system is a difficult and extremely complex task, and the librarian must realize that pitfalls, delays, and seemingly insurmountable problems constantly will plague his work

A warning should be inserted at this early point. The librarian must realize from the beginning that traditional library practices cannot be transferred in toto to automated procedures. If this is the librarian's expectations and desired results, an automation program need not be begun, for it will be doomed to failure. Compromises often must be made between past practices of the librarian and the capabilities and unfaltering logic of the machines. However, in no cases, it will be found, need the basic principles of librarianship be compromised in an automation program, but only local policies or relatively minor techniques of performing services must be abandoned at times.

For example, perhaps the first conflict that will confront the librarian will be a decision to settle for all upper-case print over the high costs of both upper- and lower-case print.

When to Automate?

"When to automate?"

A program for the automation of a library should be begun only after the existing organization has been surveyed for over-all understanding and after a plan of action has been completed. In addition, the following five conditions should be met before the program progresses beyond the visionary stages:

1. The idea of automation or of proposed programs must have the positive and active support and confidence of the library's governing board or the person or persons to whom the library is responsible

2. A proposed program must have the support and confidence of the library administration and of the remainder of the staff, particularly key department heads or supervisory personnel

3. The funds necessary to develop and install an automation program must be available

4. Qualified resource people such as machine manufacturer's representatives, systems engineers, or library automation specialists must be available, in addition to the programmers and machine operators essential to support the program

5. Not least of all by any means, sufficient and continuing time on a computer system must be available on an adequately-scheduled basis to support the program

Who Should Automate?

The question arises as to who should automate the library.

It has become fashionable to retain an outside automation consultant to survey a library's situation, to recommend changes and procedures, or even to prepare a program for the library staff to follow. Such surveys can be beneficial, but excellent automation programs can be initiated by utilizing the present staff only or by hiring an automation specialist as a permanent staff member, with the assistance, cooperation, and support of a staff of computer programmers and operators in a separate department or agency.

The most important responsibility of the library administrator is to see that the proper person is placed in charge of the automation program. This person in charge of the program necessarily must have an active interest in automation and must be substantially free from other duties in order that he can adequately administer and supervise the automation activities.

If an outside consultant is hired or if a person or persons from an outside computer center is contracted in some manner to plan an automation program for the library, then a member of the library's staff must be assigned the duties of monitoring the progress of the program and of serving as a consultant to the planners. Outside consultants often tend to ignore problems that are present while the computer people consistently tend to underestimate

and over-simplify the library's problems and needs.

Influences on the Planning and Design of an Automation Program

In all, there are hundreds of small details which will influence the design, planning, and implementation of an automation program. Every program must be "custom-made," so to speak, for a library, and no two programs in different libraries will be the same.

These differences are due mainly to the fact that no two libraries themselves are exactly the same. There are geographic differences, which could affect the availability of equipment and personnel; there are political differences, which could affect the financial and moral support of a library; and, most importantly, there are personnel differences, which could cause varying goals to be set, different approaches to service to be established, and even differing means of performing the same operations to be utilized.

Of course, there are thousands of similarities to libraries; management devices such as automation tend to make them even more congruent. But still, today, an automation program in one library cannot be lifted and installed in another without some alterations to the program or to the borrowing library.

Background of the Designers.--One of the major factors influencing the design of an automation program will be the training, experience, and imagination of its designers. A program will be small if the designers think small, it will be weak in those areas in which the designers are weak, and it will be bad if the design is bad.

Some of these adverse qualities can be overcome if other personnel are tapped for their particular or specialized knowledge. Other systems analysts,

computer programmers, or operators, machine customer engineers, machine manufacturer's representatives, and even other librarians supervising other automation programs can give beneficial advice which can improve a program. The quality or success of an automation program seldom is due to one person alone but to many people working as a team. This does not mean, however, that the program does not require the driving and unifying force of a leader, for it does.

Desired Goals and Aims of the Library.--Another major factor influencing the design of an automation program is the desired goals and aims of the library. The program for a large public library serving smaller satellite libraries would be quite different from that of a small college library serving a distinct and controlled clientele. Also, a library desiring the centralized processing of materials for a number of collections would design a system different from that of a library with no centralized processing anticipated.

Age and Size of the Library.--The age of a library will not exert as much of an influence on the design of an automation program as will the size of its collection, but age and size usually are proportionate. A hundred-year-old library with five million volumes obviously will have a different approach from that of a new library with only 1,000 volumes.

Conversion of a large amount of records in a library to a machine-readable form is expensive, and economic solutions to the problem still are being sought. An automation program will have to be designed with this in mind. It would seem safe to state that the difficulties encountered in automating a library increases rapidly in proportion to the library's age and/or size.

Funds Available.--The funds available to a library will influence its automation program. Limited funds usually mean a limited program, but not

necessarily a bad one. A master plan executed step-by-step over a period of years as funds become available is almost unbeatable.

Few libraries can afford to install a "total system" of automation in their libraries at one time. Lack of funds, personnel, time, facilities, and other factors will force a program to be implemented in stages overa number of years.

Equipment Available.--The equipment available to the library and the amount of time it can be utilized will influence a program's design almost as much as any one other factor. A plan for a computer system utilizing punched cards only as a storage and input medium will be designed differently by necessity from one with magnetic tape and disk storage available. A program to be run on a small computer will be different from that on a large computer. Using punched paper tape rather than punched cards will alter many records and routines. On-line equipment available also could improve a program favorably.

Whether equipment is available in the library or in an outside computer center should not alter the automation program, but the difference in sharing costs with others as in the case of equipment in an outside computer center and the difference in bearing the complete costs as in the case of equipment within the library could influence the budget required. Also, equipment within the library could be available for the library's use 100 o/o of the time, whereas equipment housed elsewhere might be available to the library only 10 o/o of the time.

A clear-cut and well-defined understanding, if not a written and binding contract, should be made with the administration of the computer center to make

certain that adequate programming and computer time will be available to the library, not only during the design and implementation stages of the program but on a continuing basis afterwards. Inadequate computer time can deal a death-blow to a library's program faster than any other one factor. No automation program should be begun without such provisions.

Other Automation Programs.--Other automation programs can influence the design of a library's program. If the MARC tapes from the Library of Congress are to be utilized locally, the record format and programs to handle the records must be compatible with those designed by the Library of Congress. This in turn will influence many other programs and many policies and procedures within the system.

The proximity of another automated library could cause a library to alter and align its program with the automated one. The desirability of tapping a state- or nation-wide network of some kind could cause a large part of an automation program to be designed in a particular manner.

The Costs of Automation

"How much will automation cost?"

The costs of automation can be high initially. With little effort, the librarian can double the costs of his work by converting to machines. Good results from automation cannot be expected in a matter of days or weeks or even sometimes months or years. Its costs can be reduced competitively with manual routines only after proper programming, "debugging," and converting are complete and after the size of the staff is stabilized, efficiency is increased considerably, and after all functions are interrelated and coordinated into a unified program.

Given the proper conditions, an automation program can be installed with a minimum expenditure of funds. Spreading the implementation of the program over a period of time can maintain the investment at a reasonable level each year. Should the library have access to a computer at reduced rates in its city government, on its campus, or in a similar situation, that major cost will still be scandalous but can be lowered considerably.

Purpose of the Master Plan

"Where do I begin?"

The concensus of opinion seems to be that the area which is the most troublesome or which is the largest bottleneck to providing good service to library users should be automated first. For example, if circulation is the greatest single problem in the library, then this should be automated first.

The merit to this approach is that the elimination of a pressure-point by automation can solve a real problem of an immediate nature and, by its success, possibly can ease the task of gaining funds and support for further automation of less troublesome areas. The danger in "pressure-point" automation is that a problem area might be automated without adequate thought of its role in a system-wide program. Thus a sub-system designed without proper thought to its relationship to the whole might have to be re-designed later if it is to fit into the total automation program.

To avoid the possibility of having to re-design a sub-system after it is once automated and to provide coordination to the short- and long-ranged program, a master plan for automation should be prepared before any machine is ordered or before a single record is converted. After this plan has been pre-

pared and adopted, then key trouble spots can be pinpointed as the first to be automated, and isolated areas can be automated with minimum fear of its not fitting into the total program at a later date.

This means that, until the complete system can be installed, one or more automated sub-systems must function alongside one or more manual sub-systems. As each is automated, it must tie into the over-all envisioned flow of work, and all connecting routines between sub-systems must operate smoothly and efficiently.

Parts of the Master Plan

A master plan can consist of four general parts: a preliminary survey, which will include an analysis of the existing system and its sub-systems; a description of the requirements for an automated system and its component sub-systems; flowcharts for both existing and proposed routines; and a time-table for implementation of the program. Several of these parts might be prepared simultaneously or integrated into one part. Machine programming, "debugging," and implementing will be part of the automation program but will not necessarily be part of the master plan, depending upon your point of view.

The preparation of the master plan will utilize a method or technique known as "systems" analysis." Systems analysis, or, simply, an "analysis of the system," is the detailed examination and evaluation of existing manual routines, procedures, and operations in order that the work can be organized or re-organized into efficient patterns of work-flow conducive to good management, efficiency, and automation.

The Preliminary Survey.--The main purpose of the preliminary survey will be to provide the person or persons who will prepare the automation program

with a thorough working knowledge of the existing day-to-day details of the operating library. Some other purposes are

1. To establish in writing the present goals of the library as a whole
2. To determine the present assigned and unassigned functions to each unit of the library and the routines and procedures involved in carrying out those functions
3. To gain an understanding of the relationship between the units as they relate to the library as a whole
4. To examine the duties assigned or unassigned to each staff member and the present methods of performing those duties
5. To determine the number, nature, and function of all files, records, tools, equipment, etc., presently used by each unit
6. To determine, if possible, the costs, special needs, difficulties, problems, adequacies or inadequacies of each unit as they presently exist
7. To project future increases in work load and other requirements for each unit

The Requirements for the Automated System.--After the preliminary survey has been completed and after the surveyor or program planner has organized the material gathered, he will use this information to prepare the requirements for the automated system and their corresponding flowcharts.

Using the information gathered in the preliminary survey, the planner must describe specifically and in detail the proposed automated system for the library and each of its component sub-systems. The description might be transferred verbatim from the information gathered in the preliminary survey, if he thinks that the existing goals, functions, procedures, etc., are sound and conducive to automation as they already are being performed.

The existing manner of performing operations might have to be re-arranged into different combinations of executions, in case he feels that more efficiency

can be gained in another manner. Or, the planner might feel that the existing sequence of routines or manner in which the routines are executed are inefficient and overlapping, and he might re-arrange and re-align them into alternate means of reaching the stated goals. Many existing routines might be eliminated entirely when automation is applied.

Each goal, function, routine, record, file, report, and so on must be described and defined as it will exist in an automated situation. The corresponding flowcharts will graphically represent the flow of work or of information through a system or sub-system in a manner which is easy to visualize and follow.

These requirements and flowcharts then will become the guidelines and/or instructions for the computer programmer to follow in preparing the computer program and other machine routines. They also will be used in re-aligning the existing manual sub-systems into automated ones and will be the basis for procedure manuals for the library staff to follow.

These requirements for the automated system probably will be changed, reworded, rearranged, or sometimes completely discarded as the machine programmer prepares the instructions for the computer. As the automation librarian communicates with and interprets the library's needs to the programmer, and as the programmer communicates with and interprets the computer's capabilities to the librarian, many changes, alternative solutions, or compromises might be necessary.

Timetable for the Program.--The automation planner should or must have a written timetable as a part of the master plan. A timetable will set goals for completion of various parts of the program and can provide impetus to it.

Establishing such a timetable also can provide a means of preparing the library's future budgets in line with anticipated results of the program over the years.

This calendar should include a date for the completion of the preliminary survey, the requirements for the automated system, flowcharts, programming, testing of the programs, purchasing or leasing of equipment and their delivery dates, designing of forms, delivery of forms, and, last but not least, the implementation of the program.

Morale of the Staff

When an automation program is first considered, the complete staff of the library should be told immediately. After they have been told about the possibility or probability of automation, the next important communication should be an assurance from the administrator of the safety of their jobs.

Library staffs, including professional librarians, are not unlike other workers afraid of being replaced by machines, however remote the possibilities are. Many librarians are chronic objectors to anything that breaks their well-worn routines. Most will be unhappy with automation at first but will soon be just as happy after the machines begin working with and for them.

The purpose and importance of the automation program and the staff's important role in the program should be explained to the entire staff. More often than not, librarians and other staff members are as afraid of loosing their importance, status,or ego-satisfaction in the organization as they are of loosing their jobs.

Involvement of the staff is a key factor to a successful automation pro-

gram. As the program is developed, the staff should be briefed from time to time on its progress. At no time should the automation supervisor plan automated routines without first consulting with the person currently supervising those manual routines. Not only can the automation librarian learn many possible ramifications to change and subtleties of requirements, but he can gain the confidence of the staff by involving them simply by asking their opinions.

A program for the education of the library staff to understand the machines and their corresponding replacement of traditional manual routines must be begun at an early stage in an automation program. Whether this be in formal courses, self-study or programmed instruction courses, in-service seminars, or by attendance at institutions such as this, it must be done and it must be done effectively.

The Future of Automation

The pattern of machine evolution is advancing at a steady pace. Equipment is becoming cheaper, smaller, faster, and more sophisticated and reliable. Advances in communications, electronics, and thousands of other disciplines, new concepts of verbal and visual communication, and, most importantly, changes in and demands upon our society and upon its institutions can not be expected to leave the library untouched if it expects to remain a true servant of man.

Automation is glamorour, stimulating, frustrating, exciting, difficult, and traumatic; but, above all, it is essential. It can be labelled a gamble, but the correct terminology should be a "calculated risk."

If successful, an automation program can move the library into the main-

stream of modern competitiveness for attention and funds and can provide its users with an efficient institution providing contemporary services they find desirable and worthwhile.

If unsuccessful or unattempted, the unautomated library must take its chances at becoming an institution unable to join its automated peers in many regional and national cooperative movements, unable to provide multi-functional and radically-changing services to an enlightened and demanding public, and unable to prevent its services from being usurped by other agencies or by commercial firms.

Libraries perhaps could escape efforts of automation for several years to come if their life depended solely on such "housekeeping" functions such as bookkeeping, preparing catalog cards, pockets and labels, circulating materials, sending overdue notices, and so on. But, fortunately, a basic commodity of the library - bibliographic information - increasingly and enticingly is available in machine-readable form. Since the best methods of tapping this life-flow will be with similar machines, devices, or methods, more and more libraries will discover that it behooves them to be automated at least to a certain level.

If the librarian is convinced that automation is desirable and if a program is constructed carefully and with an open mind, automation of the library can be successful. If the librarian is convinced that automation won't work in his library, then it probably won't. There are enough good automation programs in libraries today to prove that machines on the market now are adaptable to many of the needs of the library. In these days of rapid changes, of new social concepts, and of ever-increasing technological capabilities, by stating, "it

is not possible," the librarian is risking being replaced himself by someone who believes, "it is possible."

Is automation in libraries just a passing fancy or is the trend likely to continue into a more permanent movement?

The future of automation in libraries probably is no differeent from that in other groups and professions: libraries will be automated with or without the blessing of the librarian, and those who survive will be the ones who adapt and align their thinking to a healthy and proper balance of their unique intellectual services with the decidedly limited machine capabilities.